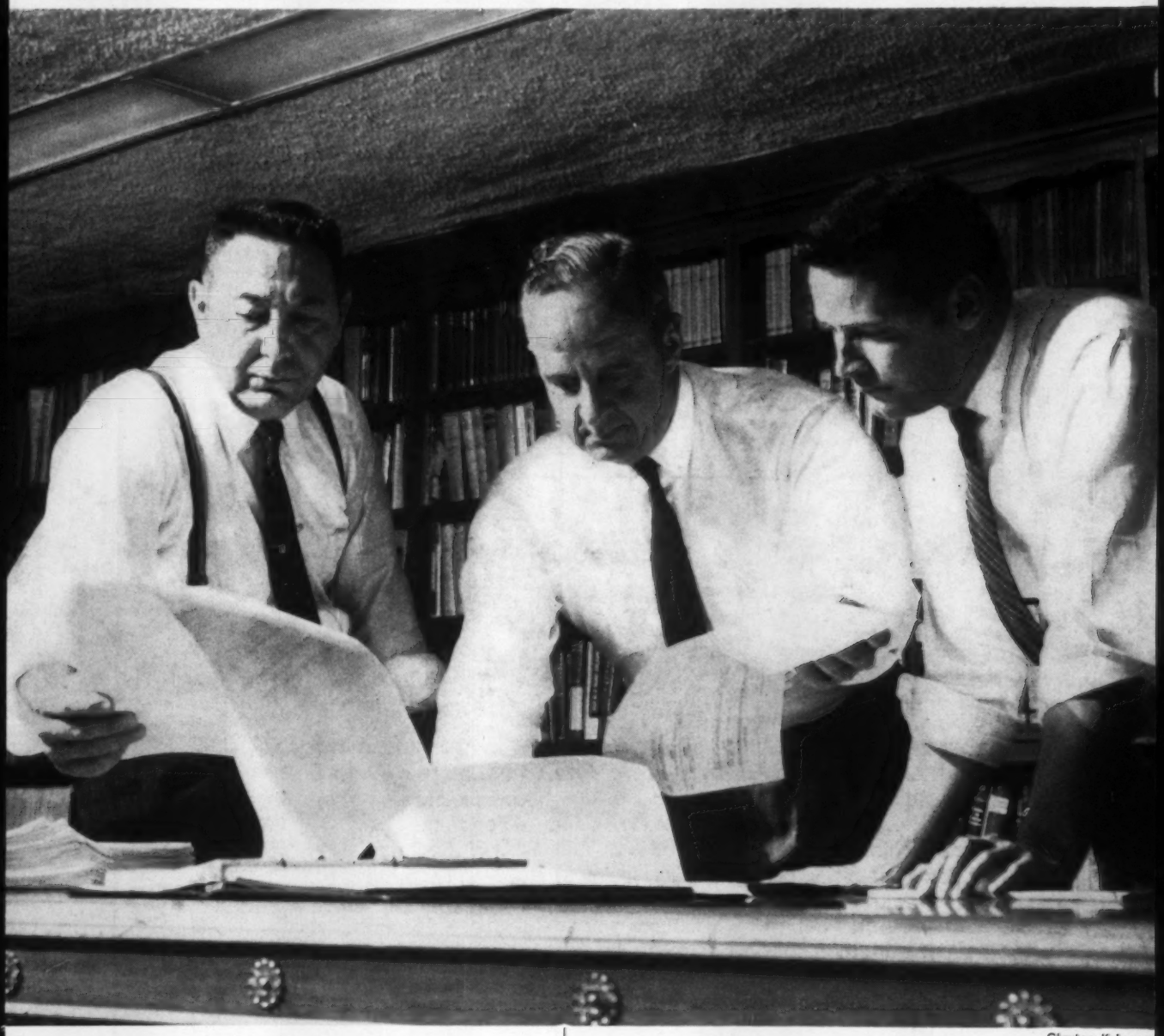
IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication JULY 7, 1960



Clayton Knipper

★ A New Series: What's Coming Up in Labor?

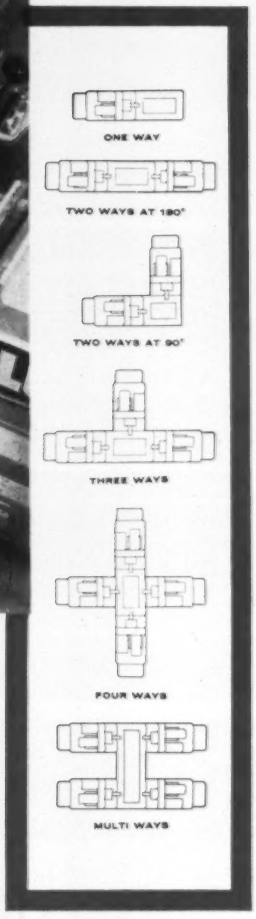
The Pattern of 1960's Labor Settlements p. 39

Research: How Big a Budget? p. 44

Gas Alloys Steel in Coils p. 73

Digest of the Week p. 2-3

TYPICAL
"BUILDING BLOCK"
ARRANGEMENT



4-Way Production Savings with Ex-Cell-O Way Machines

1 LOWER COST Each Ex-Cell-O "Building Block" Way Machine Unit has standard base, table slide and complete, inbuilt hydraulic system. You can specify only the standard spindles or accessories that meet your present needs. **2 INCREASED FLEXIBILITY** One Way-type unit gives you a basic, versatile precision boring machine; as operations become more complex, simply add one or more Way units to a common end section to multiply production or machining functions. **3 MORE VERSATILITY** Ex-Cell-O Way Machines permit precision boring, turning, facing or grooving, chamfering or counterboring—with or without automatic cycles, work indexing or clamping. **4 GREATER CAPACITY** Using simple fixtures, you can rough or finish-machine larger, heavier work than possible on most standard boring machines.

Ask your Ex-Cell-O Representative about savings with Way-type Machines, or write direct for details.

SEE EX-CELL-O'S BOOTH 946, NMTBA EXPOSITION

Typical setup shows four units positioned at 90° for simultaneous rough boring, counterboring and trepanning. Beds, tables, center section, hydraulic systems, controls and Ex-Cell-O Precision Spindles are standard components. Units can be rearranged at any time.

60-29

EX-CELL-O FOR PRECISION

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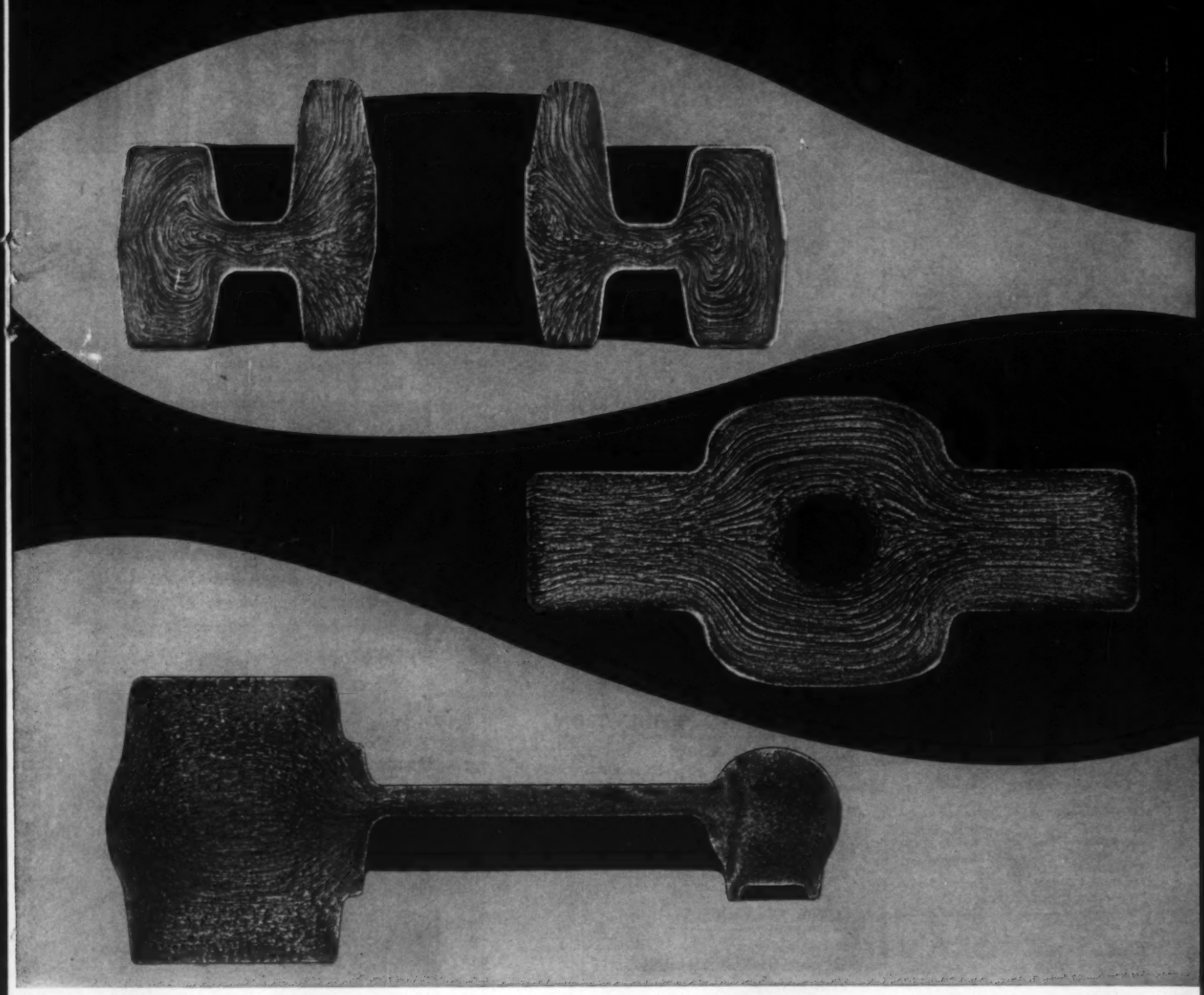
EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN



Only forgings have flow lines like these

When quality steel forgings are cut in half, polished, etched, and dyed, you can see one reason for their great strength. The grain structure shows how the forging process has "worked" added strength into the steel. Note how the grain follows the contour of the forgings, placing the greatest strength—*across* the direction of flow—where it is most needed.

Forged steel is sound steel

Forged steel has strength without undue bulk. It's economical because it saves many costly machining and fabricating operations. Forging improves the steel's mechanical properties, adds to its service life.

High-grade forgings can be made only from top-quality steel

Bethlehem produces special-quality carbon and alloy steel for forgings: bars, billets, blooms. Just call our nearest sales office for your steel requirements.

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The IRON AGE

July 7, 1960—Vol. 186, No. 1

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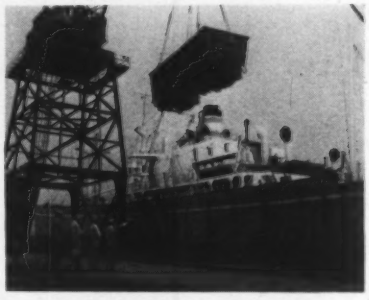
MINIATURE MACHINES

A New Market—A new need has created a new market. Miniature machines are being developed to cope with the problems of space age hardware and instrument production. P. 42

FOREIGN TRADE

Markets to Develop—Are U. S. businesses losing export markets



by default? Many people in government think so. Some aid is coming in credit; other assists from Export-Import Bank. P. 43

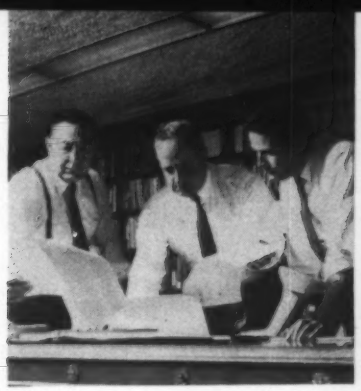
TESTING AND RESEARCH

It's Worth the Cost—More and more small companies find they need research and test facilities. And there's evidence that the benefits warrant the extra costs. P. 44

DEFENSE BUDGET

Modernize Defenses—In its final form, the budget provides addi-

Metalworking



Cover Feature

LABOR SETTLEMENTS—This is the first of a series on labor. Ray Vacha and T. L. Murry, of Associated Industries of Cleveland flank R. F. Swander of Columbian Vise and Mfg. Co. as they review contracts. P. 39

tional funds for all of the services. The extra money will be used to update defenses. P. 45

WEST COAST

Metalworking Grows—Here's a list of new and expanding metalworking companies to check in California. P. 61

Engineering-Production Developments

OPEN-COIL GAS ALLOYING

Economically Possible—A major breakthrough in steelmaking centers on an open-coil process of gas alloying. This process changes the chemistry of steel—not in the molten state but in coiled form. Estimated savings for steel coils range from $10-40 per ton—depending on the type of steel. P. 73

REDUCE CASTING DEFECTS

Planned Attack — Cooperation between supplier and user is essential in solving complex casting problems. After analysis, follow-up action prevents defect reoccurrence in future castings. Results include: Reduction in scrap, better end products and a savings in manufacturing costs. P. 76

TAPES CONTROL DRILL

Speed Short-Run Jobs—Punched tapes replace costly jigs and fixtures in tooling up for drill-press operations. Programmed system responds to data punched in fiber tapes. Easily stored, each tape can be used 30,000 times and can be quickly reproduced. P. 78

HIDDEN RIVETS

Change Joint Designs — Sheet metal fabrication is made quick and easy with the use of blind rivets. Metalworkers realize the time and effort saved by their use. For many reasons blind riveting proves well suited for sign making. P. 80

BERYLLIUM EXTRUSION

Steel Jacket Helps — Beryllium tends to seize or gall when it is extruded. Seamless steel jackets prevent both seizing and galling. They also preclude oxidation and serve as lubricants. Surface finish also improves. P. 84

Market and Price Trends

REPORT TO MANAGEMENT

Economy in a Squeeze—Lack of forward buying by industry is a big reason why business is in a summer rut. Durable goods are hard hit. But overall business looks good generally. P. 51

WASHINGTON

Tax Cuts Shelved—It will be another year before industry can get a possible tax break. Only change made now hits depletion allowances in extractive industries. P. 57

MACHINE TOOL

Waiting It Out—There may be several reasons for the lag in domestic machine tool orders. But foreign orders continue to support the industry. P. 58

STEEL SUMMARY

Now New Record—All hopes of a new record steel production this year have faded. Best that can now be hoped for is 115 million tons. The record is 117 million tons. P. 105

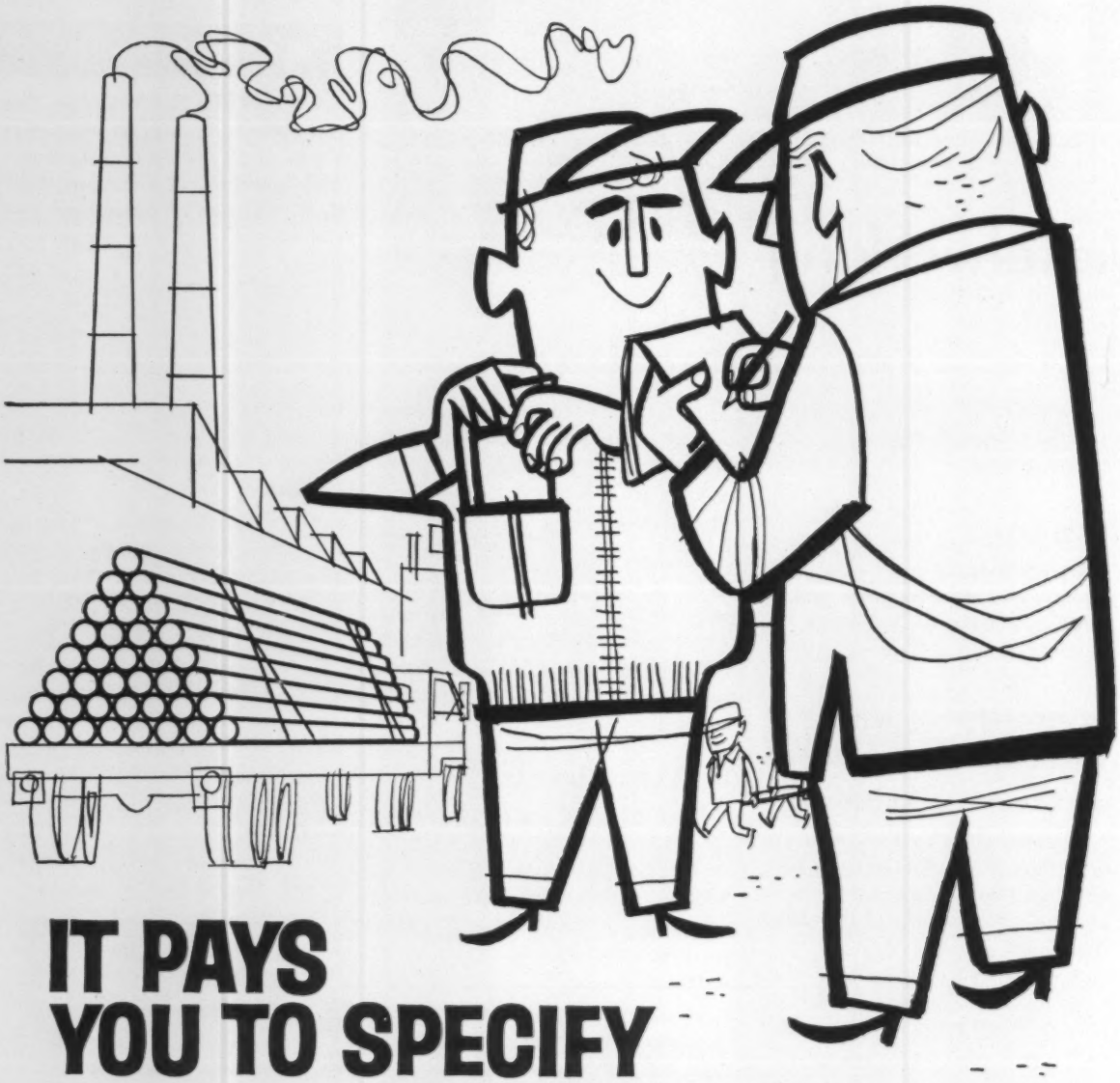
PURCHASING

Not So—Business has leveled off, but has not come up to earlier expectations. However, businessmen report that things are satisfactory. P. 106

NEXT WEEK

CORPORATE IMAGE

Identification Needed—Keeping a corporate image intact through diversification and expansion is a problem. Next week industrial designer Channing Wallace Gilson gives the professional side of maintaining identity.



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when ordering from your steel service center

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Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals

Rubber takes pounding that wears holes in steel

BIG chunks of ore—some weighing up to 2 tons—crash down from that vibrating feeder to a wear pad below. This terrific pounding 8 hours a day, 5 days a week, quickly wore holes in a wear pad of ½" thick steel plate, caused frequent shut-downs for repairs and replacement.

To avoid these costly delays, a B.F.Goodrich distributor suggested a wear pad made of a rubber called Armorite, specially compounded to stand this sort of a beating. This rubber is soft enough to *give* under the pounding it gets, yet so tough that it is even used in some places to carry broken glass.

The Armorite wear pad stood up under the pounding for 14 months —six times longer than the steel plate. And the Armorite wear pad pictured at left, which replaced the first when it finally wore out, is expected to last even longer because of a different method of installation.

B.F.Goodrich Armorite can be used in dozens of ways—as a liner, curtain, throw mat for protection against abrasives. Can be ordered with or without a reinforcing back of fabric, fiber or steel. Your B.F.Goodrich distributor has full information on Armorite. And, as a factory-trained specialist in rubber parts, he can answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-864, Akron 18, Ohio.*

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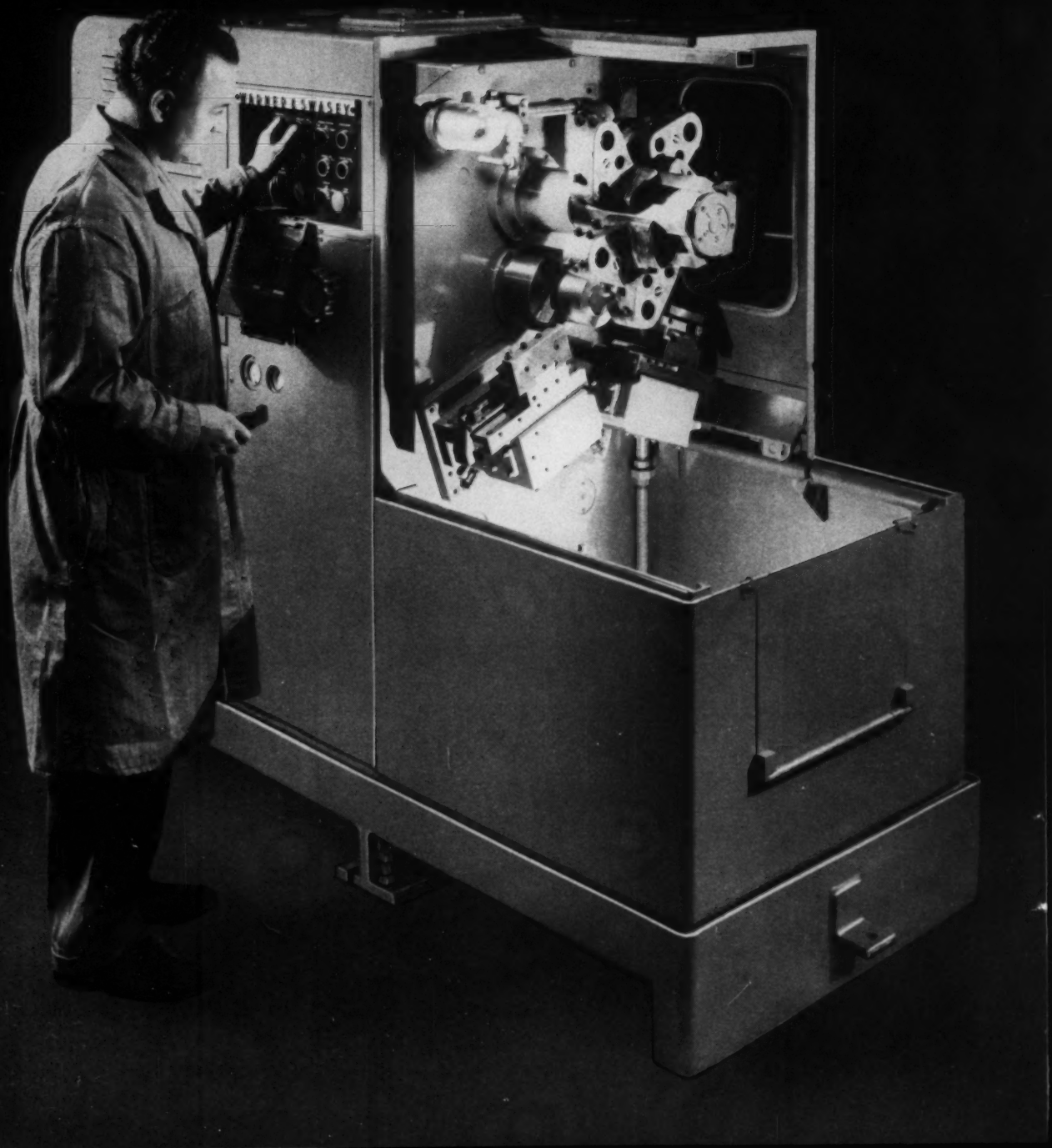
CHUTE LINING

NEW! WARNER & SWASEY'S O-AC Single Spindle Chucking Automatics designed to automate the production of small precision parts...hold exceptionally close tolerances...set up fast on small lots



Russia Vs. China?

Don't Ever Let It Fool You!

There are many stories to the effect that Mr. Khrushchev does not see eye to eye with Red China. It is also argued that the Red Chinese masters are of the old Stalin school, that they believe war is inevitable.

It is probably true that Mr. K often feels a little insecure about China. It may also be that he does not entirely approve of the drastic communal tactics of the Red Chinese. But we don't really know what Mr. K believes except that he wants to bury us.

In sections of more sedate and polite international society, Mr. K appears to be getting some quiet support. These people feel that we should do all we can for Mr. K because he is supposed to fear Red China. This, we are told, will cause the rift between Mr. Khrushchev and Mao to widen. This, we are to believe, will lay the groundwork for a breakup of the old-type Communism.

The wishful thinking in this "new look" argues for an eventual "capitalistic" maturity in the Russian type of Communism. Some say this will mean that eventually the Free World and the Red Russians will settle their differences. This would bring a lineup where Russia and the Free World oppose the Chinese Reds—so the argument goes.

Most of this is wishful thinking. It is hardly likely that Mr. K and Mao will have a fallout in the foreseeable future. It is likely they will have basic arguments over goals for their people. Whether or not war is inevitable as Mao says it is, and as Mr. K says it isn't, is window-dressing.

Let's take a look at the Free World. Does Britain always agree with France? Or either of them with the United States? Don't all free nations at times have some violent disagreements? Of course they do. But that does not mean that any of them would desert the others. Nor does it mean any one of them would join up with the Reds, no matter how much they disagreed.

Yet we are being asked to believe that eventually the Russians and the Chinese Reds will have a go at each other, that Mr. K is probably some day going to see the light and act more like a westerner. How simple can we be?

If the time ever comes when the Red Chinese and the Red Russians fight each other or take opposite sides of the fence, that day will be after they have finished us—not before!

Tom Campbell

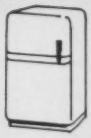
Editor-in-Chief

(Inland "job-tailored" Cold Rolled Sheets)

FORMABILITY

Like the supple bending . . . the creation of new shapes and forms by this highly-trained dancer . . . steel, too, must be endowed with similar ability . . . FORMABILITY. If it is to meet the varied needs of today's manufacturing practices, steel must be produced for ease of fabrication . . . must form dependably without springback or surface disturbances.

FORMABILITY, as a working characteristic, is carefully built into Inland Cold Rolled Sheets. Prime consideration is the use for which the steel is ordered. Inland makes certain it *knows* its customer's requirements . . . works always to satisfy such specific needs.



In Yoder forming and tangent bending of refrigerator wrappers, Inland Cold Rolled Sheets do not flute (panel) or spring back.

Television cabinet wrappers are not marred by surface disturbances even though Inland Sheets are brake press formed on fast assembly lines.

Projection screen cases are produced with Inland Sheets without time-wasting springback and with no fluting to mar attractive appearance.

INLAND

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Electronic Breakthrough

General Electric has developed a multi-functional tube called a "Compactron." The company predicts it will set a new trend in component designs such as radio, television and high fidelity. True to its name, the Compactron performs the jobs of two or three normal tubes or resistors. The device shows promise for industrial controls and instrumentation.

Ceramic Casting Shells

A new process yields complex investment castings weighing up to 100 lb. These large castings are being turned out in production runs—in almost all castable alloys. Ceramic molds serve in lieu of solid molds. The new process can be used to form shapes which can't be made by any other means.

Used Tools Are In Demand

Australians have indicated a keen interest in purchasing reconditioned U. S. machine tools, and apparently aren't scared off by the high-priced freight haul into the market. No boom is promised, but the demand is much stronger here than on European or South American markets.

Oil Aids Tube Drawing

High-speed copper tube reduction is now aided by a new drawing oil containing high-lubricity and film-strength additives. The oil eliminates the need for soap dip tanks and enables bull block speeds up to 2,000 fpm with increased pin and die life. The product burns free from the inner and outer diameters, leaving no carbon residue when annealed in a reducing atmosphere furnace.

Metal Filled Rubber

The development of a unique rubber combines a high percentage of heavy metal particals with silicone rubber. The metal particals are uniformly dispersed. It has a broad temperature range of —85 to +500° F. Other properties include its extremely good resistance to weather, ozone and ultraviolet light. The rubber provides very uniform shielding against X-rays or other high-energy radiation. It is resilient and flexible.

Tracers Can Do More

With emphasis on the more exotic electronic "brains," some advances in tracer controls have been overlooked. Developments include attachments that produce intricate contours; accuracies of one ten-thousandth; multiple units for automatic screw machines. Five tracer attachments are being used on a six-spindle job. Multiple tooling on two-dimensional turret lathe tracing work is another production feat.

New Reactor Material

A new powder metallurgy technique produces uniform boron/stainless composites for nuclear reactor control. The balanced, uniform dispersion of boron in stainless is done by the sinter-wrought process. After sintering and hot-working, the parts are as fully dense, ductile and strong as a cast alloy of the same composition.

More Bright Annealing?

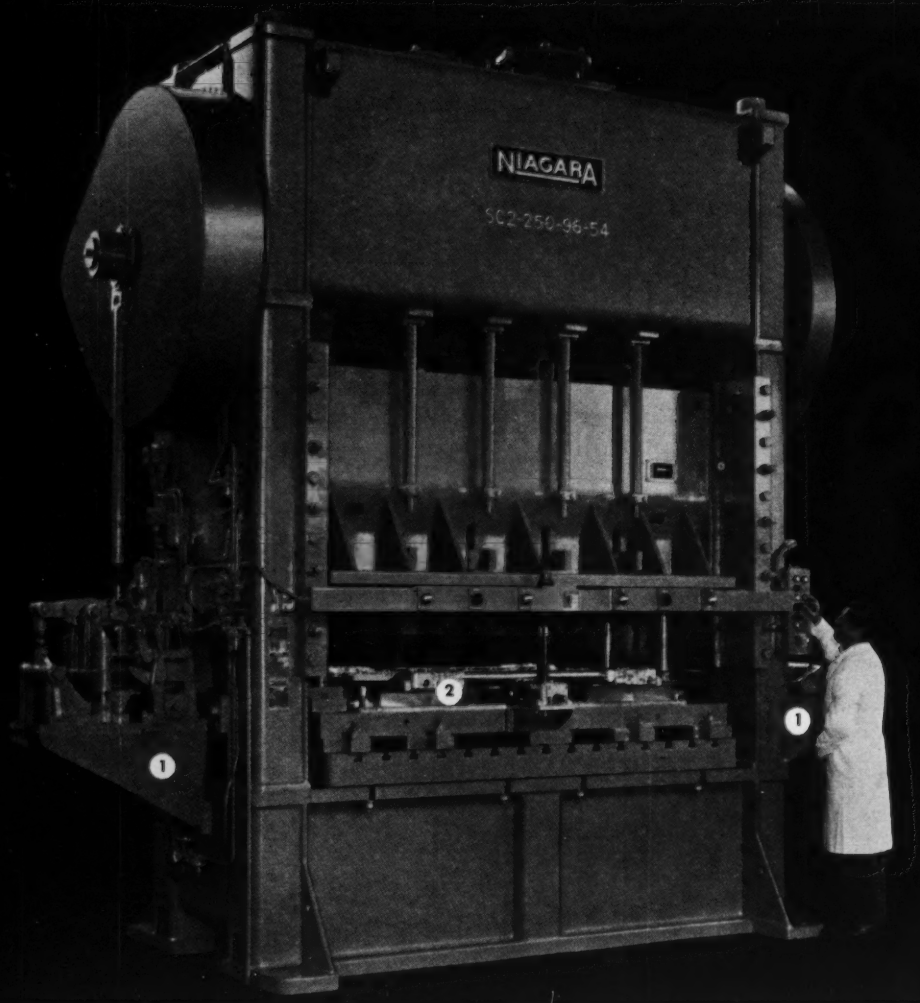
Look for early action in the field of bright annealing for stainless strip. Three vertical furnaces have been ordered. A fourth producer is holding up a decision on new facilities until a new production model starts up in a few weeks. Others are watching closely.

Improved Aluminum Ingot

A major producer of sheet aluminum, Quaker State Metals Div., reports success in casting a high quality ingot at satisfactory rates of production. Smaller equiaxed grain size is one result. The other is the reduction, if not elimination, of dendritic structures. Success is traced to a casting machine that operates on the direct chill principle plus nucleation and degassing techniques.

it's yours in the Niagara line:

A BIGGER PRESSFUL OF PERFORMANCE



- Rigidly built, all-steel frames of patented, triple box section design.
- Box-type, welded steel slides reinforced with heavy webbing.
- Extra-long, adjustable gibs that fully contain the slide during working stroke.
- Laminated, non-metallic ways . . . an exclusive Niagara press feature to prevent scoring.
- Low-inertia pneumatic friction clutch and brake for trouble-free, high production.
- Centralized pressure lubrication.
- Operating controls conveniently arranged on master panel.
- Unusually liberal shutheight and extremely long slide adjustment to accommodate a wide range of stamping and forming dies.

TWO-IN-ONE FLEXIBILITY

Here's a 250-ton Niagara Straight Side Double Crank Press, at contract metal stamping plant of Belmet Products, Inc., equipped with:

1 Roll feeds for progressive die work on coil stock.

2 Nine-station transfer feed mechanism and dies for work with pre-cut blanks . . . quickly removable as a self-contained unit.

Progressive die stamping . . . deep drawing . . . heavy blanking . . . lamination punching . . . you name it! Niagara Straight Side Single and Double Crank Presses are the profitable choice for numerous stamping requirements. No other line can match them in the middle capacity range. Once you've checked their operating and structural features, it's easy to see why.

Built in a combined range of 50 through 500-ton capacities, Niagara Series SC-1 and SC-2 Presses are available in non-geared, single geared or double geared models, with either single or twin-end drives. All can be outfitted with automatic feeds, adjustable speed drives, pneumatic die cushions, special controls and devices for automation.

Learn how you can get "a bigger pressful of performance." Be prepared for the next time you buy a straight side — single crank or double crank. Write for illustrated Bulletin 64. *Niagara Machine & Tool Works, Buffalo 11, N. Y., District Offices and Distributors Everywhere.*

NIAGARA straight side presses

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MODERN MACHINE TOOLS PRODUCTION EFFICIENCY

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

LETTERS FROM READERS

A Solution

Sir—Being a small manufacturer himself, a client called our attention to the "Owner-Management Background Works Against Small Suppliers" in the March 24 issue. Same was particularly pertinent as in reorganizing this firm we are separating ownership from management. As this is Part II of a series, I'd appreciate if I could have a reprint or tearsheet each of the other parts of this series. Thank you very much.

Going through this issue, I was stopped by your ". . . Lost for Time-To Better Think it Through?" editorial. You might be interested in knowing about the solution I've found to the problem. It is simply that I make the need for thinking something through—either alone or in communication with others— an objective. If I need more information in order to form sound judgment, acquiring that information also becomes an objective.

It works! Objectives are goals. Establishing and working toward goals is a positive approach, whereas dwelling on problems is negative . . . often results in mere remedial action of a "stamping out fires" nature instead of preventive action that stops fires from breaking out.

The reason most executives don't find time to think is that they work like firemen, rushing to put out a fire that is already ablaze, rather than working as a safety engineer would in directing his efforts toward removing fire hazards and preventing recurrence of fires.—Erwin H. Klaus, Los Angeles, Calif.

▪ **Copies have been sent.—Ed.**

From Brazil

Sir—We owe your address to Mr. Bartlet, component of the American Economic mission who now is visiting Sao Paulo.

We told Mr. Bartlet we are the manufacturers of self-lubricated bushings and bearings made of sinterized bronze powder.

We informed Mr. Bartlet that we would like to contact some American firms in order to study the possibility of enlarging our line production, including new products, as well as of manufacturing parts in sinterized iron powder.

Mr. Bartlet told us that you could perhaps accomplish this contact and suggest firms eventually interested in entering the Brazilian market.—Mancal S.A., Coxia Postal S.P. 11.796, Sao Paulo, Brazil.

▪ **As a policy, we do not supply lists of either potential customers or supply sources. But possibly some readers are interested in South American Markets.—Ed.**

Equal Billing

Sir—T. M. Rohan's Special Report: Seaway Fights Growing Pains, IRON AGE, June 9, 1960, skipped from our neighboring town of Conneaut, O., right to Buffalo. Nary a word about Pennsylvania's only Port on Great Lakes and Seaway, in a periodical published in Pennsylvania.

We would not minimize the importance of our sister Ports, but the port of Erie, Pennsylvania merits equal billing.—Olive K. Nesbitt, Erie, Penna.

World Demand

Sir—We are the technical representatives in this country of a large European manufacturer in the fields of glass and chemicals, the Cle de Saint Gobian of Neuilly, France.

Our parent company wishes to obtain a copy of your publication entitled: "Booming World Demand For Autos Spurs Expansion In Europe" (Special Report), IRON AGE, May 5, 1960.

Mention to this article was made in the Distribution Data Guide of June, 1960. — H. Forshian, New York.

▪ **Copy is on the way.—Ed.**

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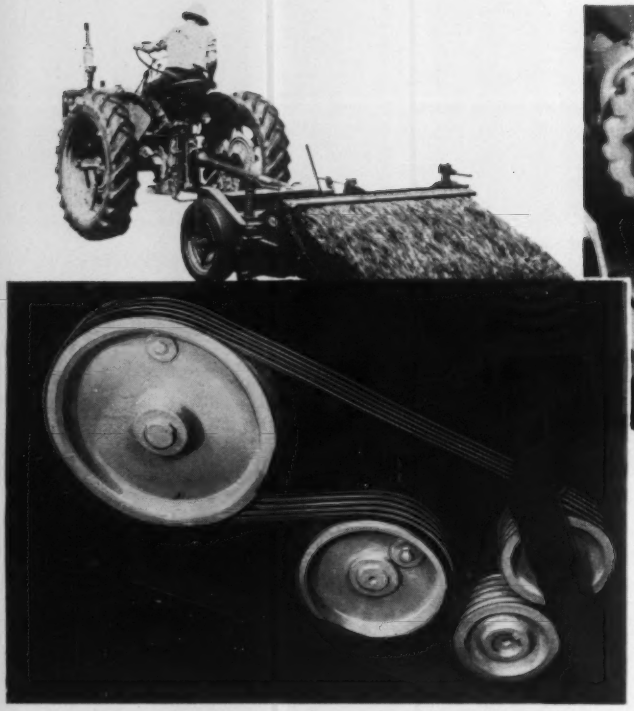
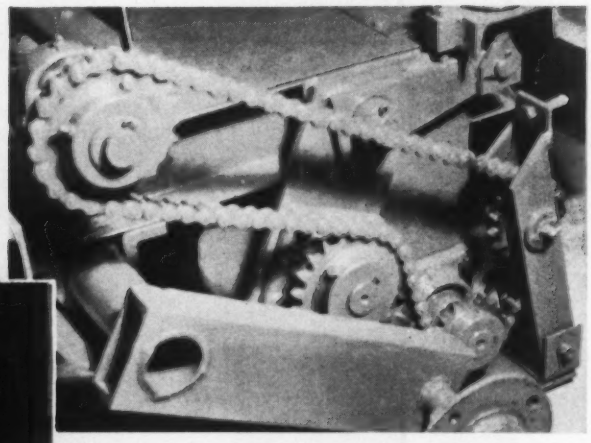
Ask your Capewell Distributor for the complete story

CAPEWELL

THE CAPEWELL MFG. CO.

HARTFORD 2, CONN.





FORMER DRIVE: The high speed operation of Gehl's Cure-All Hay Conditioner caused failure of the roller chain drive.

PRESENT DRIVE: Both the limited space and high speed requirements were met with this Gates Super HC V-Belt Drive.

Gehl Brothers Manufacturing Company Finds

Super HC V-Belt Drive handles speeds chain drive couldn't take!

Roller chain drives on Gehl's Cure-All Hay Conditioners **"would not stand up under the speed of operation." Yet conventional V-belts that would fit into the space available could not handle the working load for this outstanding line of forage harvesting equipment.**

The design problem remained a tough one until the introduction of the Gates Super HC High Capacity V-Belt early last year. Then the Gates Field Engineer, working closely with Gehl Engineers designed the new drive shown above.

"The Super HC V-Belt Drive has eliminated need for shear pins and clutches, has increased efficiency, and lowered maintenance costs," is the pleased report from Gehl personnel.

Take advantage of Super HC on your equipment

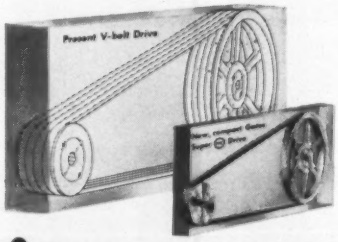
Whenever you have a drive change on a new model or are replacing belts or sheaves, let your Gates Representative show you how Super HC Drives can reduce sheave diameters 30% to 50%, drive space up to 50%, drive weight and cost as much as 20%.

A handbook, "The Modern Way to Design Multiple V-Belt Drives," is yours for the asking. Simply contact your Gates Representative listed in the Yellow Pages.

TPA 505

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates *World's Largest Maker of V-Belts*



Gates Super HC V-Belt Drives

same hp capacity in smaller "package"

FATIGUE CRACKS

Capital Change

A few minutes ago, the regular weekly Washington column passed through our hands on its way to the composing room. We handled it with mixed feelings. For the first time in about eight years, the byline did not read —By G. H. Baker.

New Hand—Instead, the regular column will now be written by Ralph W. Crosby.

But this is the kind of change we like to talk about, not lament over.

First, George Baker is still very much with us. As head of the newly enlarged Washington Bureau, he will supervise our overall Washington coverage.

Ralph Crosby, who is an experienced young newsman, will write the Washington column and handle other IRON AGE assignments in the Capital.

Hard at Work—As you will notice in this week's issue, he has had a busy week. In addition to the Washington column, p. 57, he analyzes the defense appropriations passed by Congress, p. 45.

What all this means is that you will get more and even better Washington news in The IRON AGE in the months, and years, ahead.

Sure Winner

When we got the picture below we thought the Republicans were moving some secret convention weapon into Chicago's International Amphitheatre. It's getting that time of the year when the secrets are being moved out of the smoke filled rooms and readied for action.

But a further look showed that the elephant was helping move a huge Giddings and Lewis precision drilling machine. The drill will be part of the hundreds of machines (elephant tools?) displayed at the National Machine Tool Builders Assn. Exposition in September.

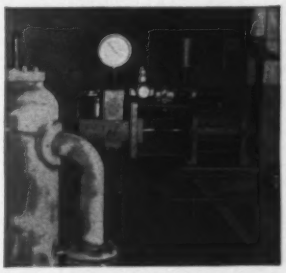
We heard that the circus playing at the Amphitheatre was a success. The National Convention July 25 may turn into a circus. But we're sure that the Machine Tool Exposition will be a top candidate for one of the best shows of the year.

Incidentally, the elephant was retired after moving the big drill. Company officials thought a faster method would be better.

CHICAGO SCENE: This elephant is moving a machine for the National Machine Tool Builders Assn. Exposition. But later this month other elephants will be in town. And their purpose is a different one.

WANT RELIABLE HYDROSTATIC TESTING TO 50,000 PSI?

Aldrich Air-Driven Hydraulic Pumps are rugged, compact... the perfect answer for production or laboratory needs . . . Operate on normal plant air... Immediate shipment from factory stock.



FOR HIGH PRESSURE VESSELS—Maker of unfired pressure vessels tests production units with Aldrich air-driven hydraulic pump, in accordance with A.S.M.E. Boiler and Pressure Test Code.

OR CASTINGS—Castings and forgings for missile, nuclear, and other industries are tested in this rig on a production-line basis. Source of hydraulic pressure is an Aldrich pump. This unit has capacity of 12,100 psi. Other pumps available for pressures to 50,000 psi. Special units to 100,000 psi.

Aldrich air-driven hydraulic pumps are dependable, economical to operate and easy to install. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

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ALDRICH PUMP COMPANY

8 Pine Street, Allentown, Pa.

A beauty of a buy!
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Black & Decker
25
New High Styled Heavy-Duty
BLACK & DECKER VACUUM CLEANERS

Black & Decker Heavy Duty Vacuum Cleaners designed to suit your every need

Take the new No. 25 Heavy-Duty, for example. Here's *whisper-quiet* cleaning in a new concept of industrial vacuuming. The 25's swivel top permits cleaning a 15′ circle without moving the vacuum. And when the job's done just throw away the disposable bag! With power to spare the No. 25 is the most compact heavy-duty vacuum on the market.

Other models, ideal for general office, factory and furnace room use, are the No. 35 (⅛ bushel capacity); No. 65 for wet and dry cleaning; No. 95 for extra capacity and power. No. 55 for super capacity (50 gallons); and No. 648, designed for efficient furnace cleaning.

Whatever your cleaning needs call on B&D power, capacity, quietness. See the line soon. Mail coupon for free demonstration.

50th YEAR

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker®

QUALITY ELECTRIC TOOLS

Capacity plus Power . . . No. 95

Super-Capacity Cleaning . . . No. 55

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☐ Drills ☐ Saws ☐ Scrunguns® ☐ Belt Sanders

FOR EASIER HANDLING

STANDARDIZE 100% ON SOUTHERN FASTENERS

If your materials movement is power-driven, mechanical or manual, it will pay you to standardize 100% on Southern fasteners. Southern Screw's proven, industry-acclaimed pallet system for bulk fastener movement and storage offers advantages that show up on the profit side of your books.

There's no extra charge for this Southern service. Your bulk fastener shipments arrive on 30" x 30" two-way entry disposable pallets to which are steel strapped 36 heavy-duty bulk cartons, each 9" x 9" x 6½". Individual cartons are 275# test corrugated board, with telescopic top. Use each carton at two different production line stations.

Standardize 100% on Southern fasteners for more profitable operation. Southern screws are 100% USA-made of finest quality USA materials.

Ask for Southern's new bulk package chart BP-2 when you send your order or inquiry to Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

Manufacturing and Main Stock in Statesville, North Carolina

Warehouses: New York • Chicago • Dallas • Los Angeles

Machine Screws & Nuts • Tapping Screws
Stove Bolts • Drive Screws • Carriage Bolts
Continuous Threaded Studs • Hanger Bolts
Dowel Screws

Southern SCREW COMPANY
STATESVILLE • NORTH CAROLINA

COMING EXHIBITS

Machine Tool Exposition—Sept. 6-16, International Amphitheatre, Chicago. (National Machine Tool Builders Assn., 2139 Wisconsin Ave., Washington 7, D. C.)

Production Engineering Show — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

Coliseum Machinery Show — Sept. 7-15, Chicago. (Contact: A. B. Perkins, 2216 South Hill St., Los Angeles 7, Calif.)

Iron & Steel Show — Sept. 27-30, Cleveland Public Auditorium, Cleveland, O. (Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22.)

Metal Show—Oct. 17-21, Convention Hall, Philadelphia. (American Society for Metals, Metals Park, Novelty, O.)

Die Casting Exposition & Congress—Nov. 8-11, Detroit Artillery Armory, Detroit. (The Society of Die Casting Engineers, 19382 James Couzens Highway, Detroit 35.)

MEETINGS

JULY

Truck Trailer Mfrs. Assn.—Annual summer meeting, July 10-13, The Homestead, Hot Springs, Va. Association headquarters, 710 Albee Bldg., Washington, D. C.

Cast Iron Pipe Research Assn.—Annual meeting, July 13-14, The Seaview Country Club, Absecon, N. J. Association headquarters, Prudential Plaza, Suite 3440, Chicago.

Metal Lath Mfrs. Assn.—Summer meeting, July 20-21, Carlton House, Pittsburgh. Association headquarters, Engineers Bldg., Cleveland.

American Electroplaters' Society—Annual convention, July 24-28, Statler Hotel, Los Angeles. Society headquarters, 445 Broad St., Newark, N. J.

SEPTEMBER

American Machine Tool Distributors Assn.—Annual meeting, Sept. 3-4, LaSalle Hotel, Chicago. Association headquarters, 1500 Massachusetts Ave., N. W., Washington 5, D. C.

Assn. of Lift Truck & Portable Elevator Mfrs.—Fall meeting, Sept. 12, The Cavalier Club, Virginia Beach, Va. Association headquarters, One Gateway Center, Pittsburgh 22, Pa.

Electronic Industries Assn. — Fall conference, Sept. 13-16, French Lick-Sheraton, French Lick, Ind. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

American Die Casting Institute—Annual meeting, Sept. 14-16, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

National Foundry Assn. — Annual meeting, Sept. 22-23, Edgewater Beach Hotel, Chicago. Association headquarters, 53 W. Jackson Blvd., Chicago.

Porcelain Enamel Institute, Inc.—Annual meeting, Sept. 25-28, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 1145 19th St., N. W., Washington, D. C.

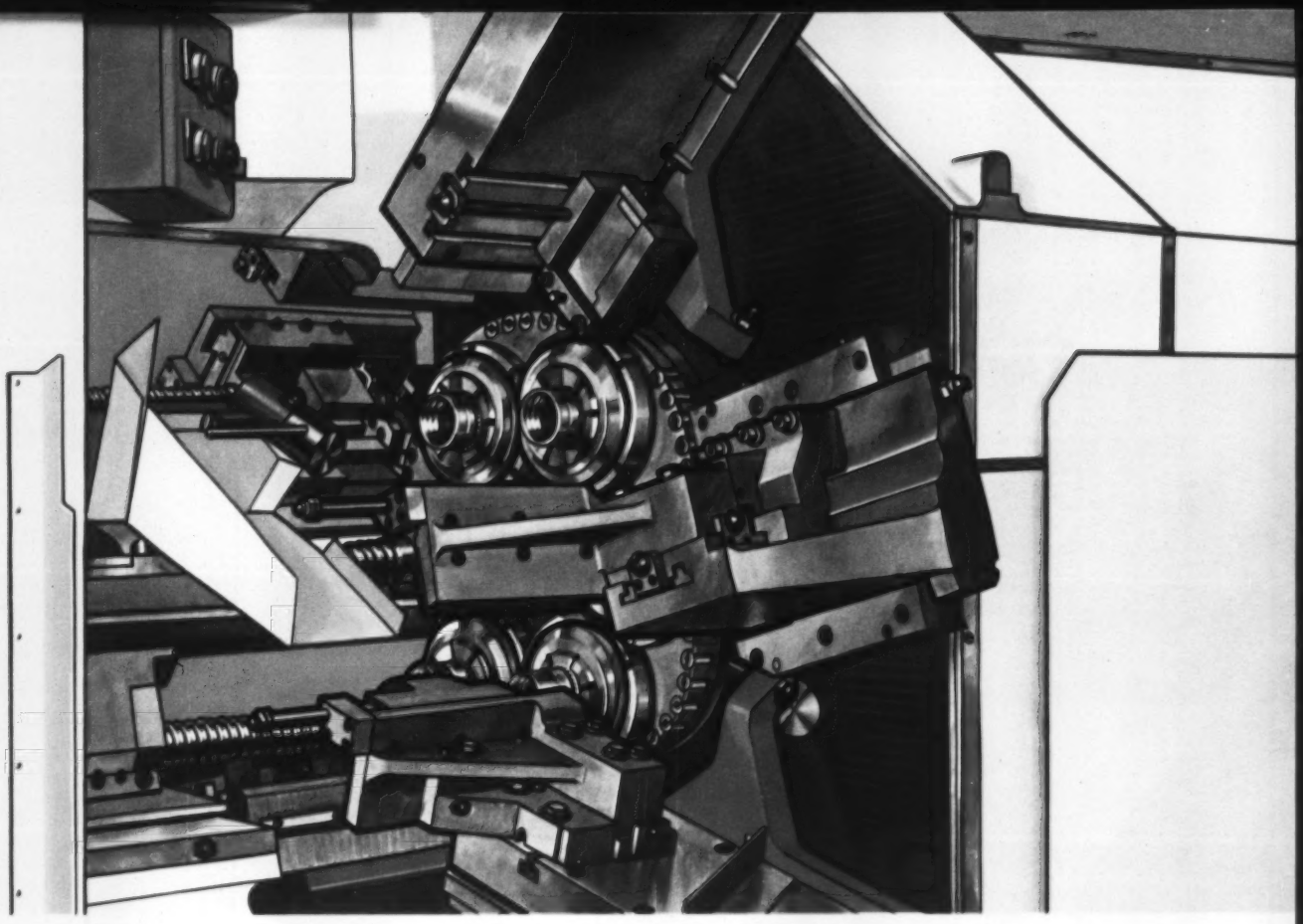
Farm Equipment Institute—Annual convention, Sept. 25-28, The Statler Hilton Hotel, Dallas, Tex. Institute headquarters, 608 S. Dearborn St., Chicago.

American Welding Society — Fall meeting, Sept. 26-30, Pittsburgh. Society headquarters, 33 West 39th St., New York.

OCTOBER

Metal Lath Mfrs. Assn.—Fall meeting, Oct. 6-7, The Greenbrier, White Sulphur Springs, W. Va. Association headquarters, Engineers Bldg., Cleveland.

American Gas Assn.—Annual convention, Oct. 10-12, Atlantic City. Association headquarters, 420 Lexington Ave., New York.



New, large capacity New Britain bar machines

If you feel you know New Britain bar machines like a book, a word of caution: There's a completely new book! New, basic design that removes limitations formerly inherent in bar machine construction. New power, new speed, completely new capability for imaginative tooling.

And new, large bar capacity. That is the important "new" we want to call to your particular attention here. You can apply New Britain standards of productivity to bar stock as large as 5⅛".

The new, big line of four-, six-, and eight-spindle models:

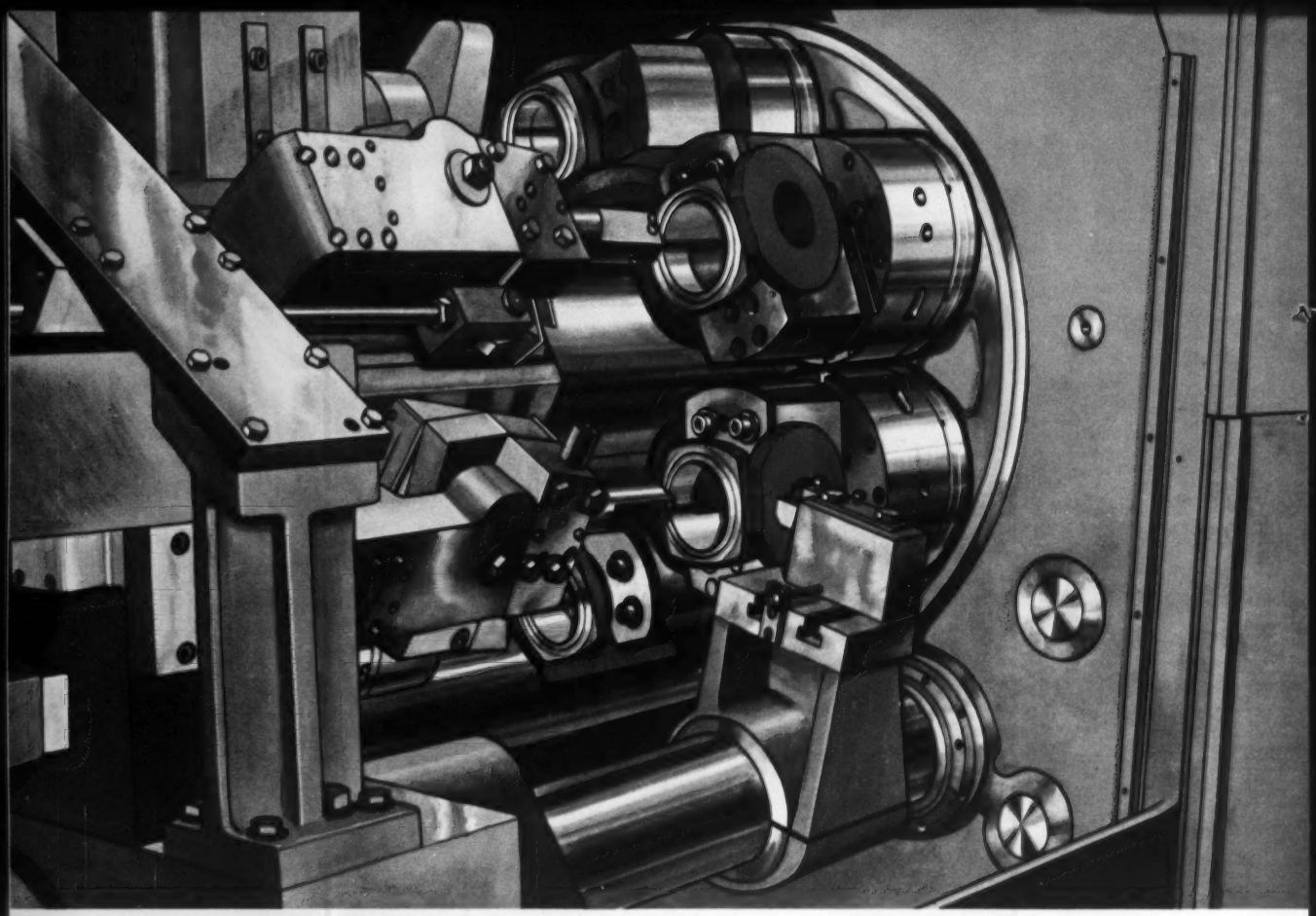
Model 450. Four spindles, 5⅛" maximum capacity, four independently operated radial cross slides.

Model 635. Six spindles, 3½" capacity, with independent radial cross slide in every position.

Model 826. Eight spindles, 2⅝" capacity. Six independently operated cross slides with the two lower slides exceptionally wide to provide elevating blocks for cross slide tooling in the number 3 and 8 positions.

Inexpensive, disc-type cams provide positive actuation of cross slides. Cross slide and end-working tools on all models are easily accessible. All models have positive spindle carrier lifting, locating and locking. New catalog material will give you further details on these machines. Your New Britain representative can show you how the increased profitability built into them can improve your competitive situation. Plan to see him soon.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut



Capacity up to 15″ on New Britain chuckers

We are going to take it for granted that *you* take New Britain chuckers for granted—as the leading make of multiple spindle automatics. Most people do. The big news then is that the profitability of these famous machine tools can now be applied to an increased range of work. The new New Britains are available with chucking capacities up to 15″, which enables you to apply New Britain standards of speed, accuracy and versatility to larger work.

The 15″ capacity applies to four-spindle models. Six-spindle machines will take pieces up to 12″, and eight-spindle chuckers will handle up to 10″.

If you work with large castings and forgings, this might be the announcement of the decade, in terms of an investment that can't fail to be profitable. With equipment like this properly adapted to your particular requirements, nobody, anywhere, is going to trim you on cost per piece.

Call on your New Britain sales engineer for practical, specific information, of course. Meanwhile, we have just published a new catalog on these new large capacity chuckers, and we would be happy to mail your copy to you on request. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division · New Britain, Connecticut

Wind Velocities to Mach 7 Prove Needle-Size Superior Stainless Tubing

Manometer lines of Superior Type 304 stainless tubing, drawn to needle size, withstand the vibration caused by air speeds beyond Mach 7 and internal pressures as high as 5000 psi in FluiDyne wind-tunnel tests of missile component models. And they have been in some assemblies for 3½ years without cracking, pinholing or buckling.

FluiDyne Engineering Corp., one of the major designers of such test facilities, attributes the long life of this Superior tubing to both its high modulus of elasticity and its resistance to the corrosive effects of mercury and soldering-flux acid.

Ductility is a big advantage, too. This permits the Superior tubing to be easily hand-bent into complex shapes for application in wind tunnels and readout equipment.

Filling stainless steel tubing orders that call for tiny needle tubing in gages from 6 to 33 or tubing with OD's as large as 1.125 in. calls for the resources Superior has to offer. Why not investigate us as a source of small-diameter stainless tubing. Catalog 21 describes the types and analyses available. Also gives tips on its selection and application. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

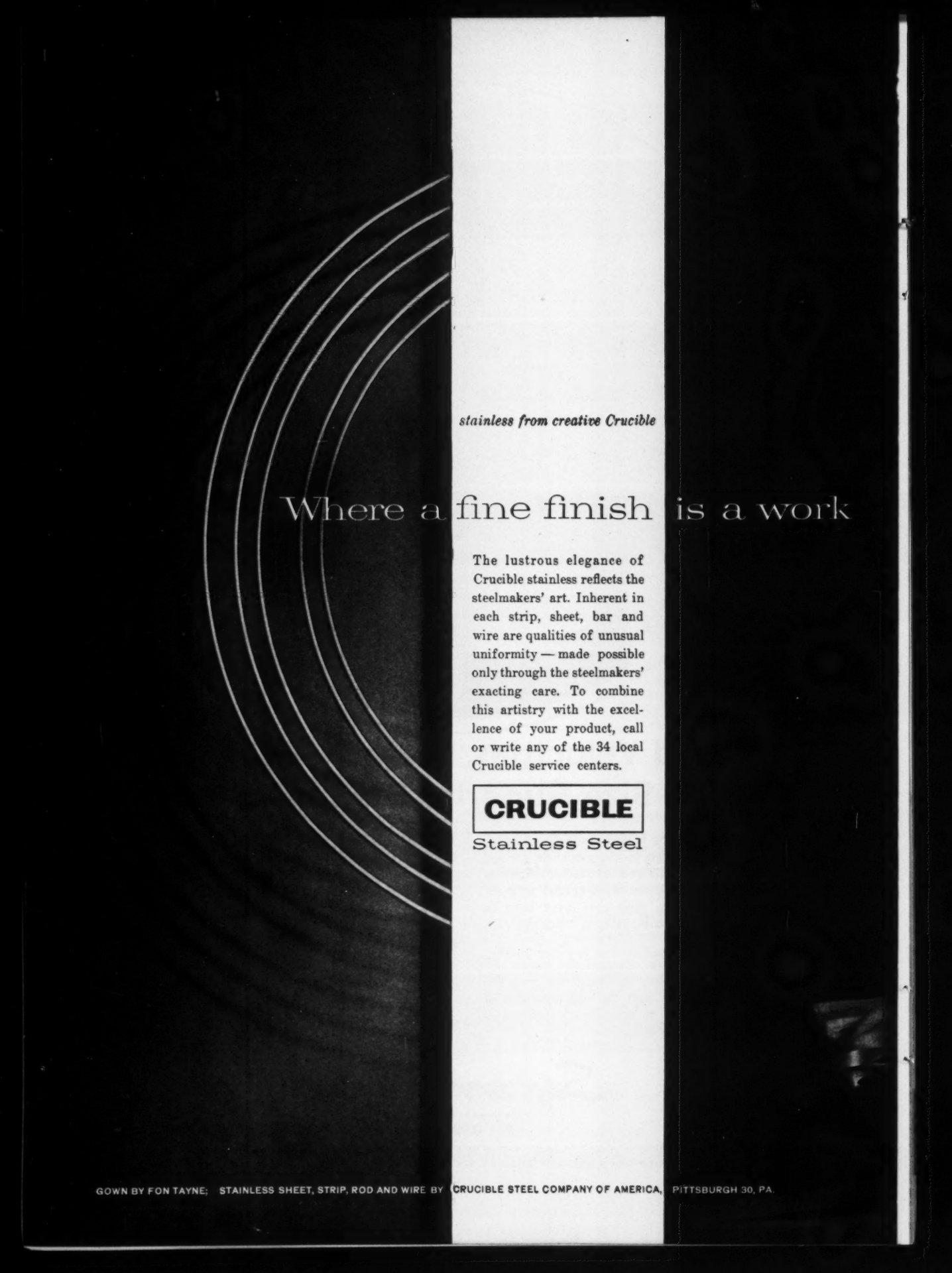
Superior Tube

The big name in small tubing

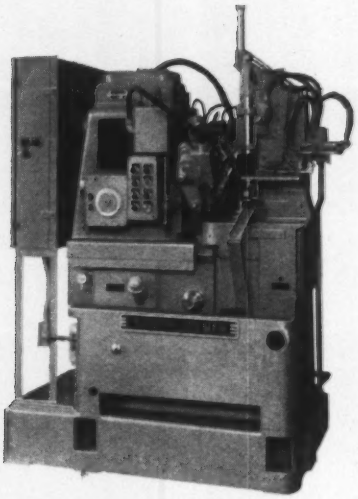
NORRISTOWN, PA.

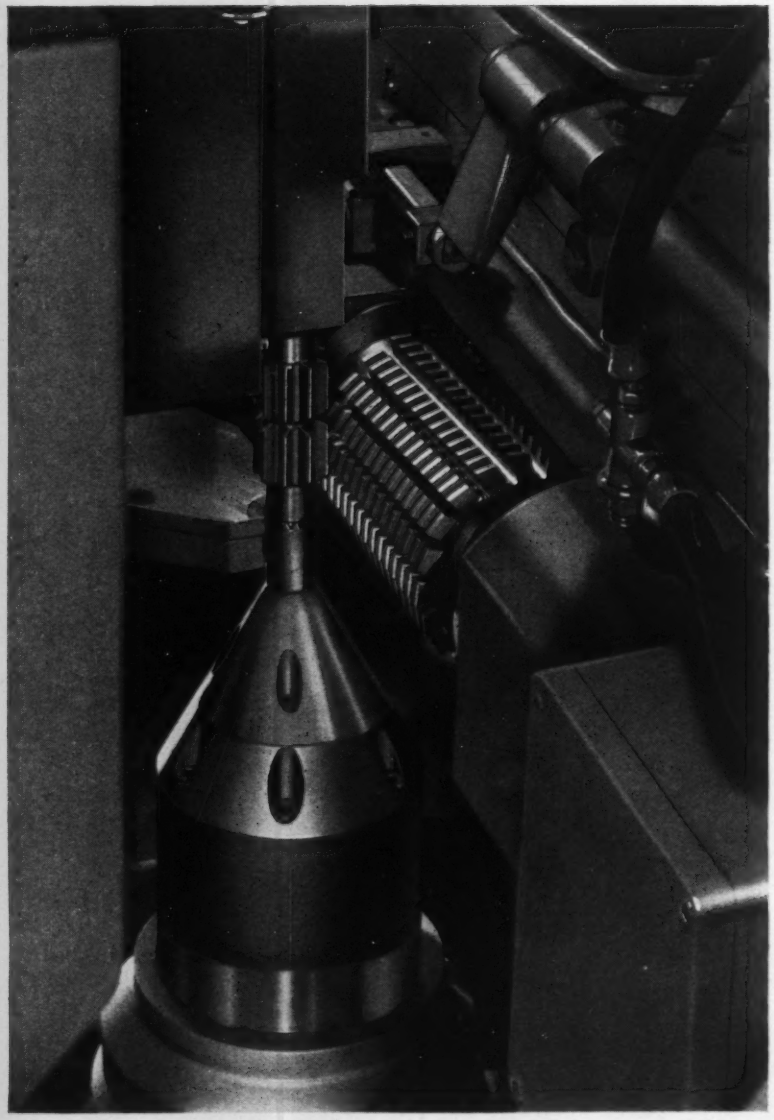
All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

West Coast: Pacific Tube Company, Los Angeles, California • FIRST STEEL TUBE MILL IN THE WEST


stainless from creative Crucible
Where a fine finish is a work
The lustrous elegance of Crucible stainless reflects the steelmakers' art. Inherent in each strip, sheet, bar and wire are qualities of unusual uniformity — made possible only through the steelmakers' exacting care. To combine this artistry with the excellence of your product, call or write any of the 34 local Crucible service centers.
CRUCIBLE
Stainless Steel
GOWN BY FON TAYNE; STAINLESS SHEET, STRIP, ROD AND WIRE BY CRUCIBLE STEEL COMPANY OF AMERICA, PITTSBURGH 30, PA.

of art





Compact, high-speed hobbing machine combines many advanced principles of gear cutting . . . for manual operation or complete automation

Whether yours is a general-purpose gear shop or an automotive plant requiring high-volume production, Barber-Colman's new No. 4-6 vertical hobbing machine can give you total gear-cutting economy — low tool cost, faster cutting, increased machine utilization.

Here, in a compact vertical, is the perfect combination of high speed, rigidity, versatility, and automaticity . . . carefully built to Barber-Colman's recognized high standards of precision and extra quality.

High capacity in a versatile machine

Automatic cycling of the No. 4-6 includes carriage feed, retraction after the cut, and rapid carriage traverse to the starting position. Combined high speeds and minimum nonproductive time between cuts make decreased cycle times a practical reality. The machine is designed specifically to be tooled for automatic

High Speed, Versatile Hobbing

. . .with Barber-Colman's new No. 4-6 Vertical Hobbing Machine

loading. However, it is simple to set up and can be loaded manually when required.

As an example, the 12-14 pitch, nine-tooth automotive pinions (AISI 1024) shown here are hobbed at 240 per hour at 100% efficiency, using a 3″ diameter x 4″ long triple-thread hob. This job has a feed rate of .045″ per revolution, and a hob speed of 362 rpm (284 sfm). Total cycle time for each load of two pinions is 30 seconds.

The machine is automatically loaded . . . a shuttle places the blanks, two at a time, under the hydraulically actuated tailstock where they are locked in position against the serrated driver. After the cut, the shuttle unloads the finished work and picks up the next set of blanks.

The automatic hob-shifter is an integral part of the automatic cycle. It can be set to operate after each cycle, or after a certain number of gears has been cut. This assures high gear production and low hob cost.

Rugged design increases productivity

Vertical design of the No. 4-6 — with integral bed, spindle housing, and upright—provides extra rigidity and simplifies application of automatic tooling. The heavy vertical column rigidly supports all motions of the machine. Movements of the column in both directions are controlled by positive stops. Hydraulic pressure holds it firmly against a depth stop during the cut.

MODERN MACHINE TOOLS MMT=PE PRODUCTION EFFICIENCY

See the new No. 4-6 vertical hobbing machine at the 1960 Machine Tool Exposition . . . Booth 923.

Close-couple design, with short shafts having high diameter-to-length ratios, minimizes vibration, even under the toughest conditions. Both the hob spindle and work spindle are mounted in precision tapered roller bearings.

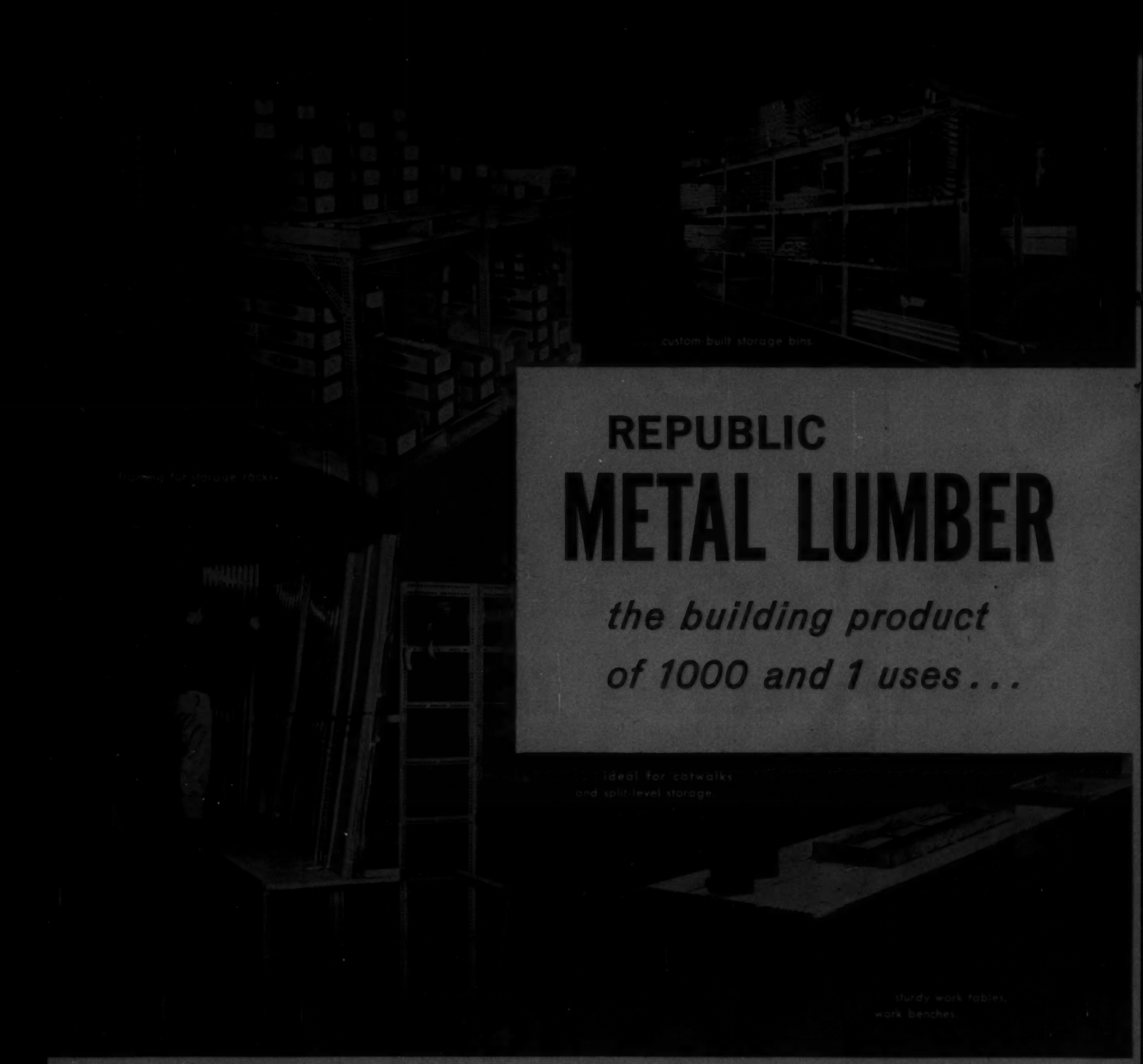
These are reasons why the No. 4-6 can offer you maximum hob speed of 614 rpm and maximum feed of .150″ per work revolution.

For complete information on how you can gain total gear-cutting economy, contact your Barber-Colman representative or write the factory direct.

Barber-Colman Company

BARBER COLMAN ®

710 Loomis Street, Rockford, Ill.



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METAL LUMBER

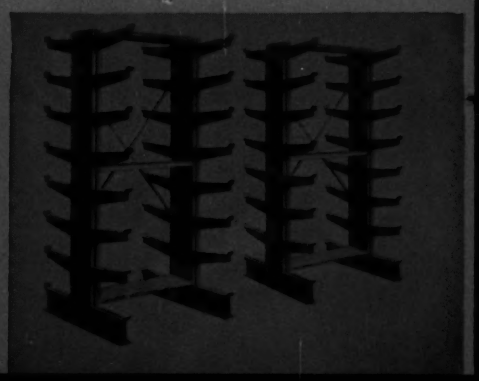
the building product of 1000 and 1 uses . . .

LET REPUBLIC HELP YOU SOLVE STOCK AND STORE PROBLEMS . . .

STANDARD REPUBLIC MATERIAL HANDLING UNITS save time in stock, store, ship operations. Reduce storage space requirements. Corrugated construction designed to deliver long, trouble-free service. Four-way fork channels simplify handling in restricted areas.

NEW...FROM REPUBLIC—COMPRESSION SHELF CLIP. Designed to ease and speed steel shelving erection. No tools needed. Simply slip clips onto uprights, snap shelf in place. Supports heavy loads safely. A profitable investment in shelving. Write for data.

NEW REPUBLIC BAR RACK is the ideal solution to the practical, economical way to store bars, pipe, rods, any elongated stock. Adjustable arm arrangement allows easy access and stock segregation. Strong, sturdy, compact. Send for additional information.



solves hard to stock storage problems

framing for raceways, cable supports, piping systems, and framework for lighting fixtures, mounts, distribution systems, control panels, and other shop framing applications

Republic METAL LUMBER — for faster, stronger, safer framing in any application where common building materials are now used.

Faster—simply measure, cut, assemble. *Stronger, Safer*—fabricated from cold rolled steel to assure uniform physical properties and high strength-to-gage ratio. Bonderized for complete protection of all exposed surfaces. Engineered slotted angle pattern speeds erection, reduces time and material costs.

Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Call your Republic representative. Or, send for attractive brochure.

framing members for overhead storage

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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☐ Republic METAL LUMBER® ☐ Material Handling Units
☐ Compression Shelf Clip ☐ Republic Bar Rack

Name _____ Title _____

Firm _____

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. . . framing for storage racks.

. . . custom-built storage bins.

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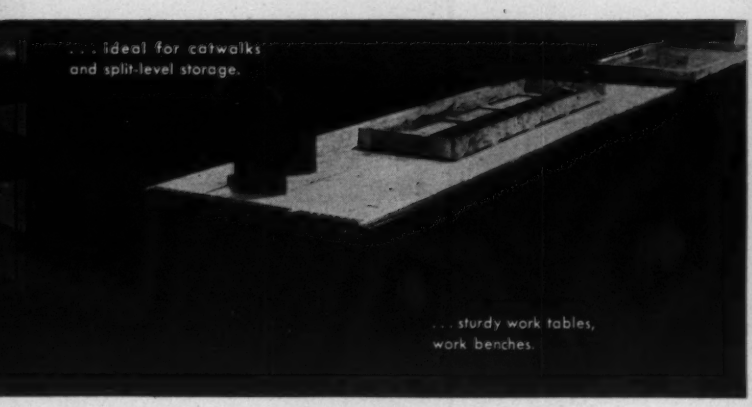
the building product of 1000 and 1 uses . . .



. . . ideal for catwalks and split-level storage.

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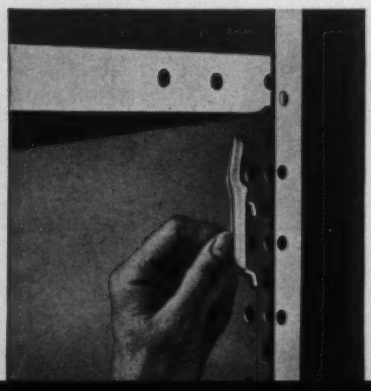

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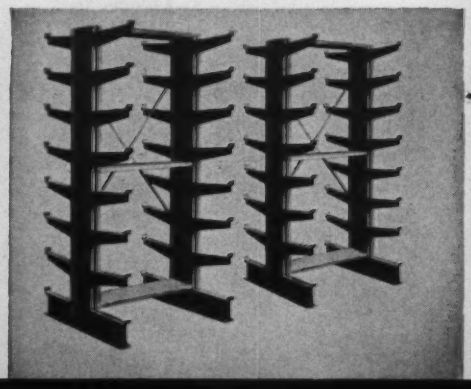

. . . solves hard to-stock-storage problems.

. . . framing for raceways, cable supports, piping systems, and framework for lighting fixtures, mounts, distribution systems, control panels, and other shop framing applications.

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Please send more information on the following products:

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☐ Compression Shelf Clip ☐ Republic Bar Rack

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

CF&I Heavyweight Shaped Coils

PACKAGED for YOUR PRODUCTION

Mr. Marwil points out in-plant handling and unloading is more efficient and economical with CF&I Shaped Coils than with mill coils. Shaped coils can also be stored more compactly.

give long production runs at Marwil Products Co.

With a 12 million unit annual capacity, Marwil Products Co., Fort Loramie, Ohio, is rated as the largest U. S. manufacturer of muffler clamps and U-bolts. Nine months ago the company switched to CF&I Wire. Mr. William Marwil, Vice President tells why:

"We find CF&I's 2000 lb. shaped coils of clean, bright basic wire are very uniform, with no 'thin' areas or rough finish. These large coils give us longer runs without the necessity for frequent set-ups on our Lewis Cut Off machines."

In addition to the high quality of CF&I Wire, new packaging methods have increased the preference for CF&I Wire.

Replacing small, light-weight coils are CF&I Shaped Coils and spiders. The spider, leased from CF&I, acts like a spool, and pays off the wire evenly and smoothly. Now, instead of losing hours of production time every day in changing small coils or unravelling tangled wire, *one* CF&I Shaped Coil can usually last many hours. The shaped coils and spiders make for easier handling and storage, too.

One of our salesmen will be glad to recommend the right "package" to increase your production and cut manufacturing costs. You can call your nearest CF&I sales office today and arrange a "no obligation" visit.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

7348

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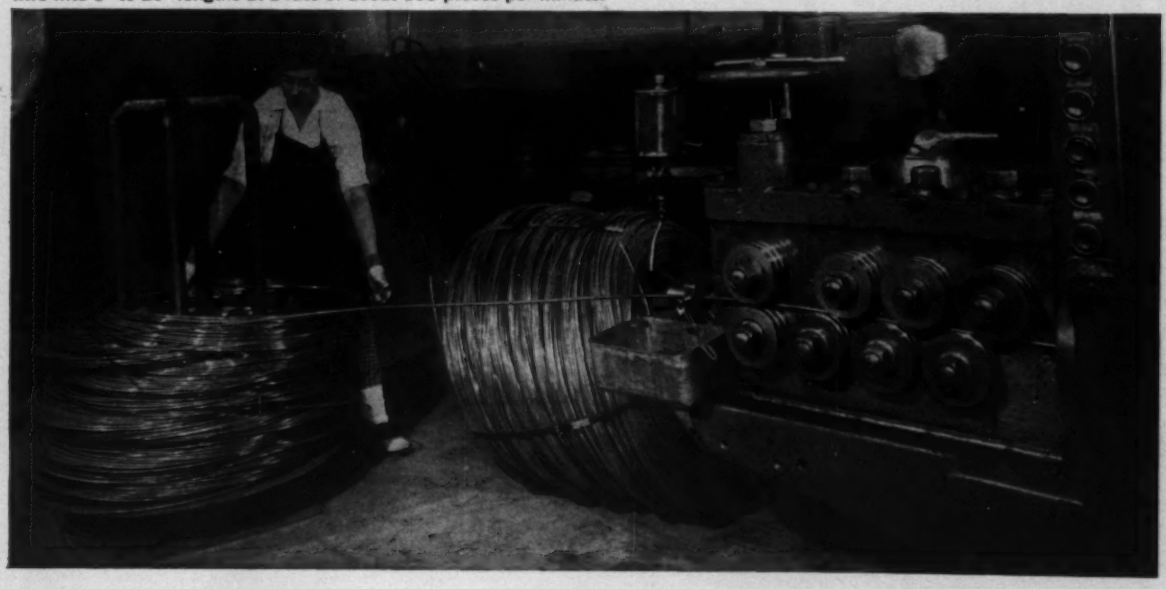
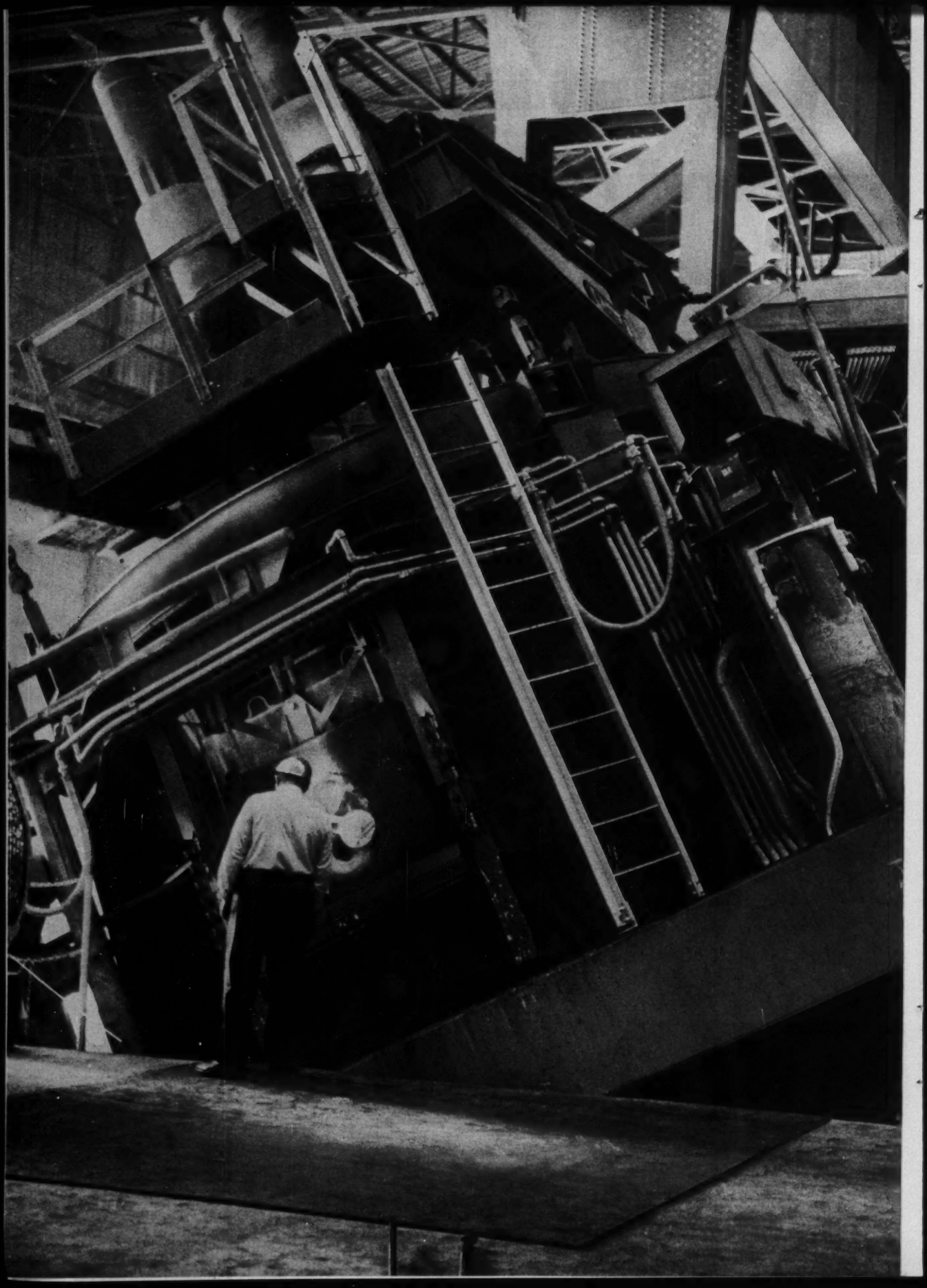
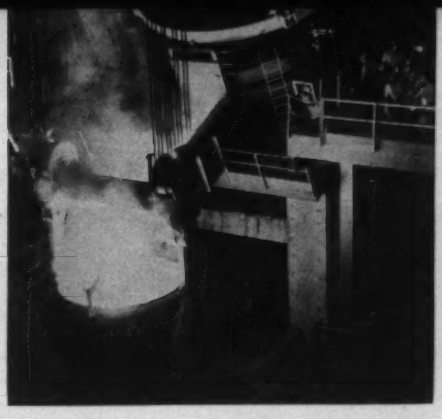
CF&I Wire being fed into the Lewis Cut Off machine. This machine cuts wire into 5" to 20" lengths at a rate of about 150 pieces per minute.







This Heroult Electric Furnace does the most efficient steel melting job at Lukens Steel

Two years ago, Lukens Steel Company installed this 20-foot diameter Heroult in their Coatesville Plant. It's a standard Heroult top-charge, swing-roof furnace with a nominal capacity rating of 100 tons. In almost continuous operation since installation, producing ordinary carbon and low-alloy steels, the Heroult's performance has proved the matchless efficiency of electric melting.

The Heroult is 100% mechanically operated. All movements are motor-driven gear mechanisms. This reduces maintenance problems, and permits your own maintenance crew to keep it performing with a minimum of effort. The Heroult has other features such as cage-type shell construction, independently supported operating mechanism, and water-cooled skewback roof ring. They all help to make the Heroult the finest electric melting furnace available.

Heroult Electric Arc Furnaces are available in shell diameter sizes from 7′0″ up, and with a rated charge capacity from 4 tons to over 200 tons. You can select door-charge or top-charge swing roof type. We'll also furnish special induction stirring equipment, duplexing arrangements, and furnaces for melting of copper and nickel.

American Bridge has the facilities and the technical know-how to handle a complete melt shop installation. This includes design, construction and installation of machinery. For complete information, get in touch with the contracting office nearest you. Or write to our Pittsburgh Office.

USS and Heroult are registered trademarks

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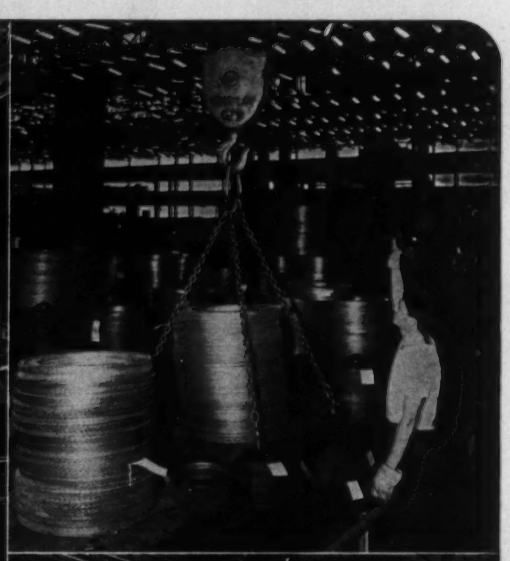
CRANES *SPEED* PALLET-HANDLING

Store More—Eliminate Congestion—Cut Maintenance—Save Floors

Pallets loaded with motor stator laminations are easily lifted and moved with these floor-operated Tramrail cranes. Note that the entire area is jam-packed, with no lost aisle-way space. The ease with which any loaded pallet can be picked up and handled to awkward-to-reach places is a distinct advantage.



Pallets with 32 100-lb. kegs of nails are piled high in storage with the cab-operated Tramrail crane and open-side pallet lift.

THERE'S no height limit when stacking palleted materials with Tramrail cranes. 20 ft.—30 ft.—40 ft. or higher are easy. Your materials and building are the only limiting factors.

Often 50% and more materials on pallets can be stored in a room served by overhead cranes. Narrowing of some aisles, elimination of others, plus higher and closer piling make the difference.

Pallet loads are moved safely and speedily overhead where the path is always clear and unobstructed. Placing this handling job near the ceiling, reduces floor congestion and frees much of it for other purposes.

Maintenance costs for Tramrail cranes are extremely low, usually only a few percent of that for power-operated floor trucks. No engines to overhaul. No clutches to replace. No brakes to re-line. No batteries to charge. No irritating gas fumes. And of importance, extra heavily reinforced floors are not required and costly floor damage because of materials handling is eliminated.

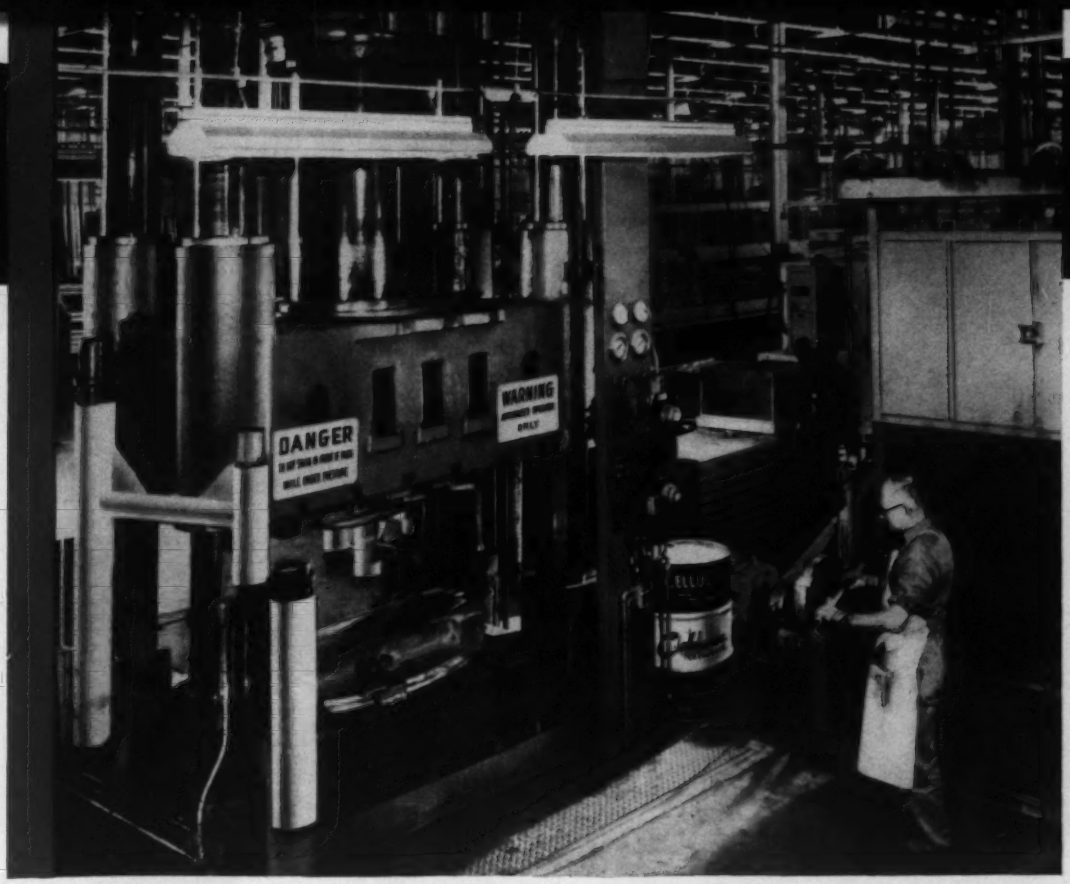
When considering pallet handling or any materials handling, it will pay you to look into the tremendous advantages that Cleveland Tramrail cranes offer.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4878 EAST 284TH ST., WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



Cellulubes promote safety at North American

where hydraulic presses handle titanium at 1000°F.

Hydraulic line breaks could be a serious fire hazard in this hot press-forming operation.

For five years North American Aviation has assured maximum safety by using Cellulube 220 fire-resistant synthetic fluid in their specially developed hydraulic press for form-die quenching. During the process, fully expanded parts at 1000°F. are transferred from a nearby electric furnace to the press to hot-form aircraft parts made of high-strength alloys.

Cellulubes, the *safe* hydraulic fluids, are available in six controlled viscosities: 90, 150, 220, 300, 550 and 1000 SUS at 100°F. You can select the viscosity best suited to your operations. Cellulubes may well make an important contribution to the safety of your plant and personnel. Write to us for more information about Cellulubes, and please let us know what application you have in mind.

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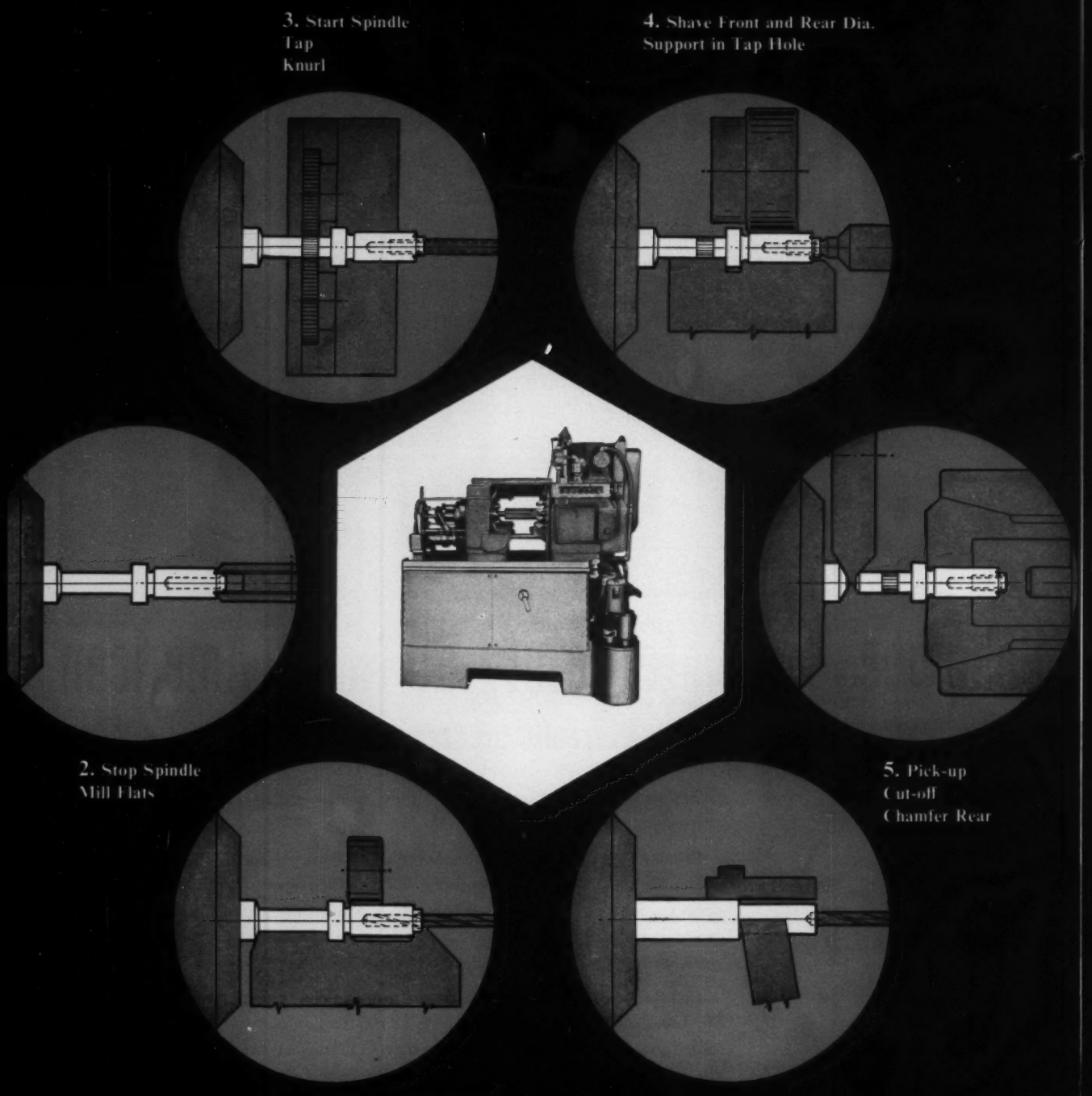
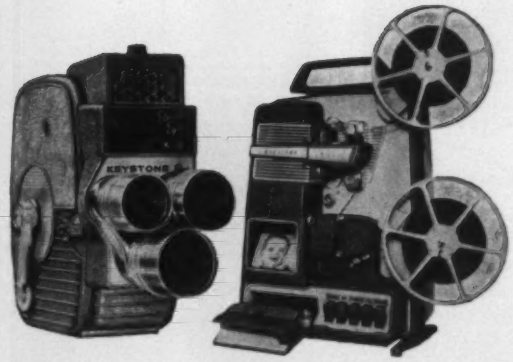
CHEMICALS



9 operations in 3.8 seconds . . . one of the typical parts produced by Keystone Mfg. Co. on the 7/16" RA-6 Bar Automatic



85,000 Pieces Per Day And No Rejects

Production *facts* tell a typically impressive story of Acme-Gridley machining efficiency at Keystone Manufacturing Company, Boston, Mass.

"We have five 7/16" RA-6 Spindle Bar Automatics", states a Keystone executive. "Everyday, they produce an average of 85,000 precision parts for our cameras and projectors . . . and yet, there are literally no rejects. As a result of this consistent conformance to our tough tolerances, scrap losses have been wiped out and inspection time reduced to an all time low. What's more, because Acme-Gridleys produce in a single set-up jobs otherwise requiring secondary machining, we've cut production costs."

Dramatic and *tangible* savings like those realized by Keystone are commonplace with Acme-Gridleys. Such features as a wide open tooling zone, direct camming and independently operated tool slides can help you achieve higher mass production efficiency at lower cost. We'll be happy to supply complete information on the world's most complete line of multiple and single-spindle automatic bar and chucking machines. Call, write or wire.

National Acme's "Zone of Responsibility" includes all phases of cost reduction

Check YOURS . . . Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Keystone Manufacturing Co. . . . an "everyday" job for Acme-Gridleys. **Indirect Costs:** effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc. **Product Redesign:** teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities. **Direct Material Costs:** our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems. **Make-or-Buy Reviews:** in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment. **Spot Modernization:** pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.

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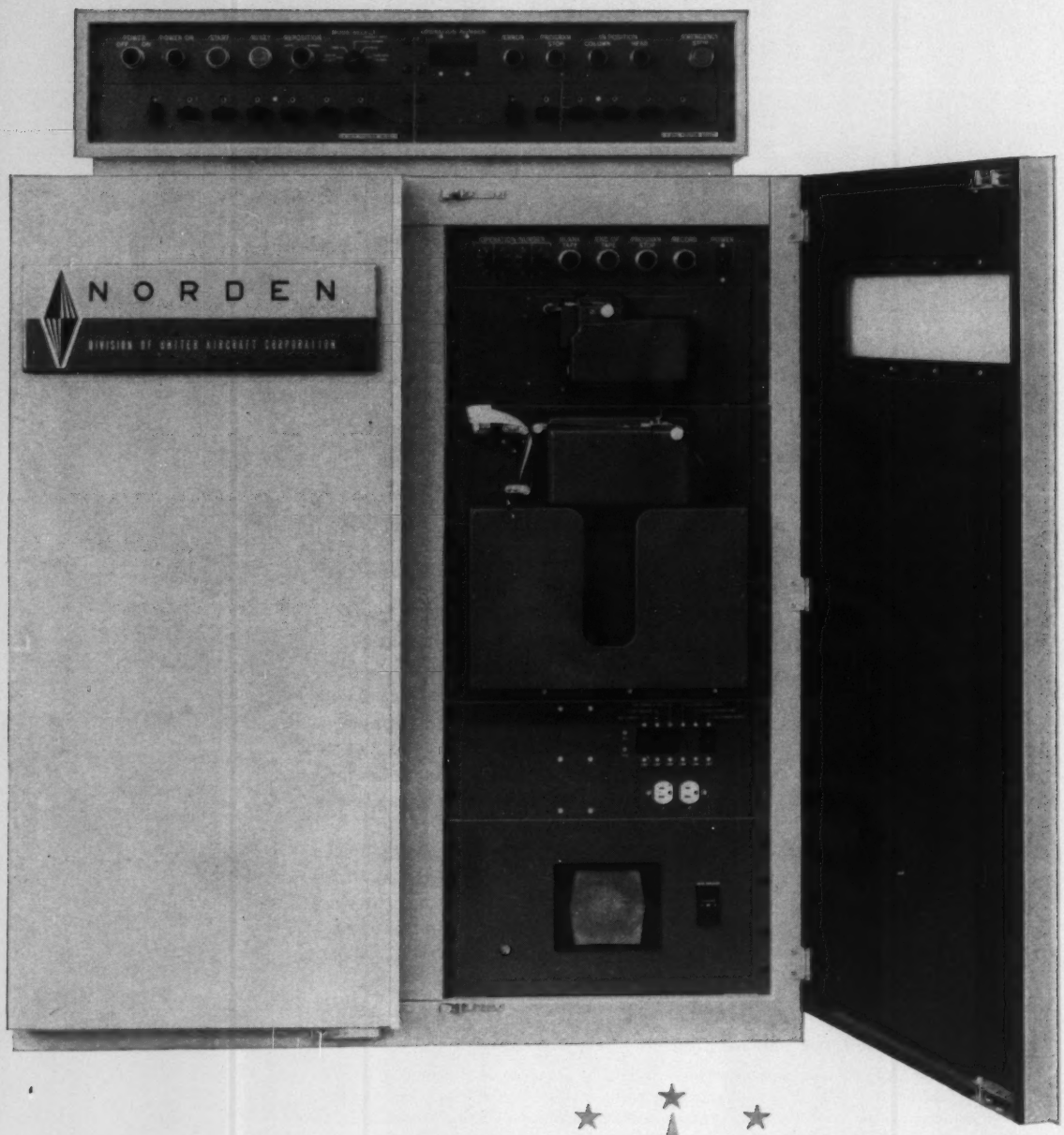


A new concept in Numerical Control

from NORDEN DIVISION

NORDEN Modumatic Control Systems feature display of actual position

■ **With Norden unique components you can automate as much or as little as you need.** This new concept in numerical control is made possible by the exclusive design of a position feedback transducer, electronic circuitry and visual display. These units are available in various systems to show the exact position of the moving members of a machine at all times.

EXACT POSITION READOUT

Series 100—This system displays in straight decimal form the exact position of the tool or work piece. One display is used for each axis of motion.

Features—Illuminated numbers, readable from twenty feet—individual plug-in decimal units—display unit can be located on machine or remote.

AUTOMATIC POSITIONING

Series 600—A completely automatic positioning system with input from either manual dial-in switches or punched tape. Display units provide decimal readout of actual position—not command.

FULL RANGE ORIGIN SELECT

Both **Series 100** display and **Series 600** positioning systems can be supplied with full range electronic origin select. Any desired offset is quickly and easily dialed in by the operator on manual selector switches

Features—Eliminates time consuming readings and calculations—eliminates human error—provides offset calculation automatically—displays exact position numerically.

CONTROLLED PROGRAMMING

These systems are available with automatic tape punch units for tape preparation "on the machine." This provides a permanent inspection record or a programmed tape for playback applications.

PROGRAMMED DIMENSIONAL INSPECTION

This new Norden concept now makes possible automatic inspection of parts by measuring their exact shape and contour. Since each point on the part's surface has a digital value this information can be easily programmed. Corresponding points on the actual part can be probed automatically and their dimensions compared with the programmed information. The system can be provided with direct numeric print or readout of actual dimensions, deviations from nominal, or out of tolerance indications. In addition, punched tape output is available.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

When in Chicago see us at the Production Engineering Show, Navy Pier, Booth 221. At the National Machine Tool Builders Exposition, see Norden Controlled Machines exhibited by G. A. Gray Company, Atlantic Machine Tool Works, LaPointe Machine Tool Company.

For more information contact your nearest Norden Representative, 400 Main Street, E. Hartford, Connecticut, JAckson 8-4811, 11 West Monument Avenue, Dayton 2, Ohio, BAldwin 8-4481, or write us at the address below.

OF UNITED AIRCRAFT CORPORATION

DATA SYSTEMS DEPARTMENT

SANTA ANA, CALIFORNIA

METALGRAMS

UNION CARBIDE METALS

. . . news of "Electromet" ferroalloys and metals

JULY 1960

NEW LOOK IN FERROALLOYS -- Steelmakers are using greater tonnages of the new forms in which certain alloys are supplied by Union Carbide Metals. For example, refined chrome and 75 per cent ferrosilicon are available as convenient pigs that greatly simplify handling. When added to the furnace or ladle, these pigs give higher metallic yield because no fines are lost in the slag. Their use? Refined chrome is used in stainless steel, aircraft and bearing steels, tool steels, and cast iron. 75 per cent ferrosilicon is a popular open-hearth ladle addition, particularly in electrical steels.

* * *

UNIT-WEIGHT PACKAGES GROW -- A popular packaging feature of many "Electromet" alloys is unit-weight cans and bags. Containing exact weights of alloying elements, these packages provide accurate alloy additions simply by counting out the number of packages required. "Chromtemp" exothermic ferrochrome and "Mantemp" exothermic ferromanganese -- highly efficient ladle addition alloys for open-hearth steels -- are packed in unit-weight cans. So are self-reducing tungsten and self-reducing vanadium, economical alloys for tool and constructional steels. Also, 17 "Electromet" alloys are available in unit-weight bags.

* * *

FORMS PROCESSED IN A VACUUM -- Other alloy forms include bricks and pellets of "Simplex" ferrochrome, a widely used low-carbon ferrochrome for stainless steel. These convenient forms are available because the alloy is vacuum-processed to drive carbon down to extremely low levels. Having the lowest carbon content of any ferrochrome available, the alloy aids stainless melters in meeting low-carbon specifications. Also, "Simplex" ferrochrome penetrates the slag and dissolves readily. As an aid to handling, storage, and inventorying, the bricks are packed in new pre-weighed steel-strapped bundles.

* * *

AT YOUR SERVICE -- Improved alloys and packaging techniques are under constant study at Union Carbide Metals. Experienced materials-handling representatives work directly with metal producers to help determine the most efficient and economical types of alloy packaging and handling in individual plants. Their recommendations on traffic, handling, storage, and usage often result in big savings in money, time, space, or material.

* * *

NATION-WIDE FACILITIES -- To meet the demand for a wide variety of alloys and metals, Union Carbide Metals maintains an efficient warehouse and distribution network to serve metal producers throughout the country. Stocks are maintained at 6 plants and 26 warehouses conveniently located near major metal-producing centers. Rail, truck, barge, and boat shipments speed products to customers' plants. Your Union Carbide Metals representative will be glad to give you further information about the products and services described above. Ask for the article, "Electromet Alloys...When, Where, How You Need Them," in the Winter 1959 issue of UNION CARBIDE METALS REVIEW.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

"Chromtemp," "Electromet," "Mantemp," "Simplex," and "Union Carbide" are registered trade marks of Union Carbide Corporation.

MANUFACTURERS' SALES OF HOUSEHOLD APPLIANCES in the last six months of 1960 are expected to be about equal the corresponding period of 1959, according to the Dept. of Commerce. This forecast represents a big jump over the first half of 1960, when sales were about 8.6 pct below the corresponding level of 1959.

CONSUMER OPTIMISM HAS SHOWN A "MARKED DECLINE" this spring, according to the U. of Michigan's Index of Consumer Attitudes. The index, in the past a bellweather of durable goods sales, dropped to 91.7 in May, compared to 99.3 in February and 90.2 in November 1959. Big reason cited for decline in optimism: Lack of business "good news."

GAS RANGE SALES ARE HELPED BY HOME MODERNIZATION activity as the general slow-down in home building continues to cut into sales. May factory shipments of 142,700 ranges were down 11 pct from May 1959. Marketing effort in the lively home modernization field is keeping sales from falling further.

GAMES AND TOYS LOOK TO RECORD YEAR. The 1960 Toy Fair report on bookings indicates 1959 record shipments will be surpassed. The industry now reports that the volume of shipments is running more than 8 pct greater than in 1959. Retail sales in 1959 are estimated to have totaled $1.65 billion.

ROSIER OUTLOOK IN HOUSING is seen by F. W. Dodge Corp. as the money market eases. The ease is expected to be felt in the mortgage market and in housing contracts "in the next few months."

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 0.9 pct decrease in May from April. The May index was 246.9 (1947-49=100) for new bookings. This is below the 1959 average of 234.7. The index of shipments rose in May to 241.3, up from 234.8 in April.

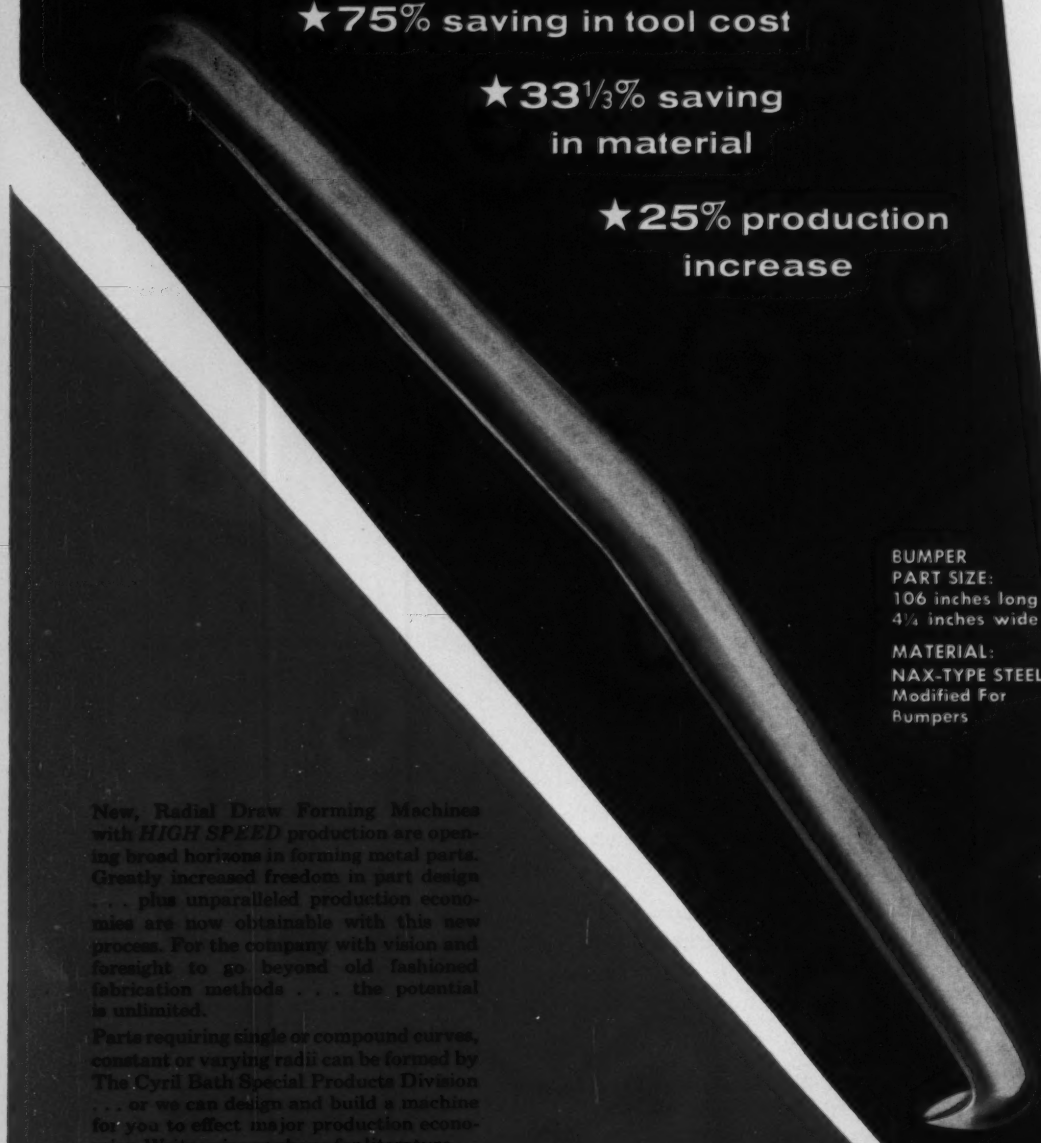
NEW ORDERS FOR INDUSTRIAL SUPPLIES AND MACHINERY were up 1 pct in May, reports the American Supply & Manufacturers' Assn. The association's order index (seasonally adjusted) was up two points to 196 (July 1948=100), reflecting the first upward movement in three months. ASMMA's index reflects orders for production tools, equipment, and supplies placed by industrial distributors with their manufacturing sources.

here is a "part-making" *REVOLUTION!*

★75% saving in tool cost

★33⅓% saving in material

★25% production increase



BUMPER
PART SIZE:
106 inches long
4¼ inches wide

MATERIAL:
NAX-TYPE STEEL
Modified For Bumpers

New, Radial Draw Forming Machines with *HIGH SPEED* production are opening broad horizons in forming metal parts. Greatly increased freedom in part design . . . plus unparalleled production economies are now obtainable with this new process. For the company with vision and foresight to go beyond old fashioned fabrication methods . . . the potential is unlimited.

Parts requiring single or compound curves, constant or varying radii can be formed by The Cyril Bath Special Products Division . . . or we can design and build a machine for you to effect major production economies. Write, wire or phone for literature . . .

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3234G AURORA ROAD • SOLON, OHIO
(LOCATED IN THE GREATER CLEVELAND AREA)
Manufacturers of Radial Draw Formers • Disc • Tools • Press Brakes • Tangent Bending Sequence Presses • Press Type Brakes • Special Machines

Labor Settlements Coast-to-Coast

National Pattern—Following 1959 closely. First quarter median settlement is an increase of 8.2¢ per hour compared with 8.3¢ last year. Small companies are settling at about 7¢, all exclusive of fringes. Unions are concentrating on job security; companies on management prerogatives.

Cleveland—Wage increases are averaging 7.19¢, not including fringes. This is close to the 10-year average increase of 7¢. But companies are making more demands of the unions, and are getting a freer hand in running their businesses.

Chicago—The average increase is about 8¢ per hour. But top and bottom are widely separated. Settlements range from 2¢ to 20¢, with 15¢ not uncommon.

Pittsburgh—Settlements here usually follow the steel pattern. But there's evidence that workers in other companies are doing better this year. One sample embracing 100,000 workers indicates 9¢ to 10¢ wage increases, with fringes following the steel pattern down the line.

Cincinnati—Slow business has made it easier for business to hold the line. The top is about 8¢, with 5¢ agreements common. But fringes continue to expand.

Philadelphia—This year wage increases are averaging about 7.9¢, lower than last year's average of 8.6¢.

Los Angeles—Attrition in aircraft causes the pattern to vary. A severance arrangement based on seniority is unique.

Labor Settlements Follow 1959

But Small Companies Are Making Good on Their Demands

So far, metalworking labor contracts closely follow the pattern set last year.

Unions get more job security; companies regain management prerogatives.—By T. M. Rohan.

■ Labor negotiations among smaller industrial firms across the country so far this year are still ending up in pay raises as high or higher than last year.

But while giving in on wages, companies are starting to wring out for the first time, many concessions in running their shops. They seem to be making more headway in cutting featherbedding than big industry groups.

The national pattern of wage settlements this year follows 1959 closely. According to the Bureau of National Affairs, Washington, D. C., labor statistics group, the median settlement in the first quarter of this year for all industry is 0.1¢ lower than the last quarter of 1959—8.2¢ against 8.3¢. For manufacturing only, settlements were 0.1¢ higher.

National Picture — Smaller firms across the country, spot-checked through employers' associations by The IRON AGE, generally are settling for about 8¢ per hour base, excluding fringes. This is higher than the 7¢ coming to Steelworkers in December and 10.2¢ over two years for railroad brotherhoods.

But smaller firms are getting concessions for their money. Main goals are to cut featherbedding, dump the cost-of-living adjustments, and improve productivity.

What's Coming In Labor?

This is the first of a new IRON AGE series on labor.

Part I discusses the pattern of current settlements. Others will analyze future developments.

Labor Goals—On the labor side, the unions for smaller plants are coming out more strongly than ever before for worker security. They are taking a good part of their pay raise in expanded insurance programs covering life, hospital and accident benefits. Pensions are being increased. The four-week vacation has been introduced in some plants for 25-year employees. And supplementary unemployment benefits of

one type or another are being added.

The Union's big concern presently is layoffs in manufacturing plants. They are out to get all the benefits they can for those laid off and increase the pay and fringe benefits for those still on the job.

Cleveland Cross Section — A well-documented example is the Cleveland area, traditionally having 2 pct of the nation's gross national product and employment. Associated Industries of Cleveland represents about some 600 local companies and handles labor negotiations for more than 100 of them annually.

In 95 settlements negotiated so far this year, the weighted average wage increase for production workers has been 7.19¢ per hour, plus fringes. In the same period last year it was 6.87¢. Across the country average base increases so far this year have clustered around the 8¢ mark. Notable exceptions are Pittsburgh and Los Angeles which report many higher settlements.

Company Strong Points — "In spite of the steel settlement, the atmosphere is still in favor of the employer," says Ray Vacha, director of industrial negotiations for Associated Industries. "This year companies are putting in more demands than the unions. Because of intense competition from other companies as well as imports, they are after a freer hand in running the business."

"One of the toughest issues now and in the future is unproductive work practices," Mr. Vacha says. "In many cases, they are simply the result of bad management years ago. It's pretty late now to try and rout out, but we are making more headway this year than in decades."

Escalators Opposed — "But the work practices issue is deeply entrenched. And those who fight hardest for it are older employees who can't or won't adjust to new jobs. So they fight for the old one through union channels. But the day of the strong back is over in industry and it's the progressive thinkers who are getting ahead," Mr. Vacha says.

There is also major opposition to using the Bureau of Labor Statistics' cost-of-living index for increases. Some of the raises from this are almost as much as the base increase.

Trial Period—As plants get into higher production rates and closer specifications, workers get more and more specialized and with greater responsibility. This results in more training and, of course, higher starting rates. So companies this year are getting longer probation periods into the contracts.

Thirty days used to be normal. But companies are now pushing for 90 and 120 day probation periods. During this period the worker is not under union jurisdiction.

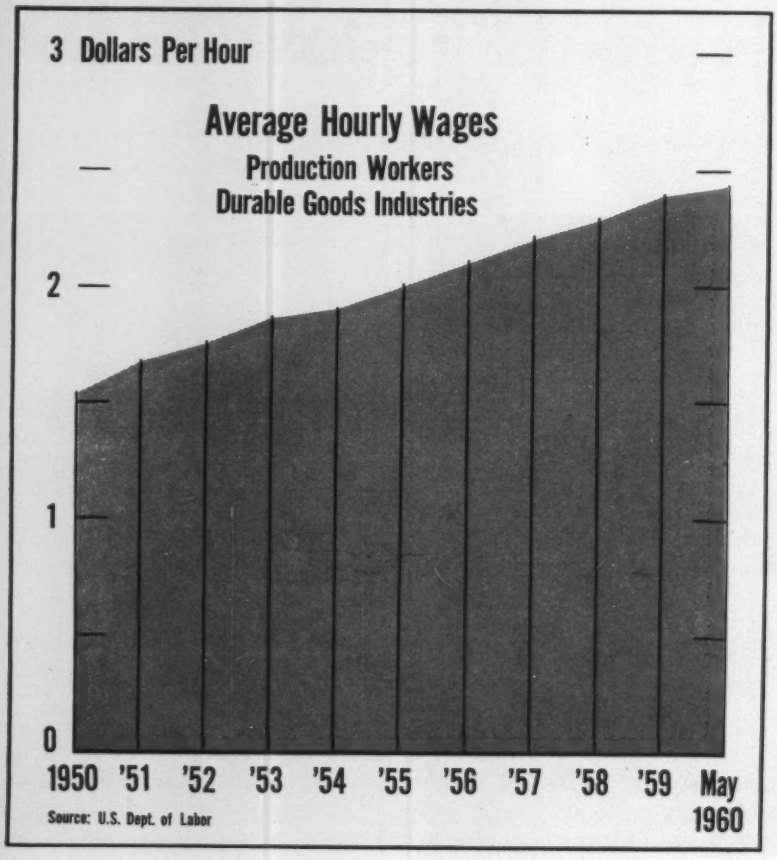
More life and hospitalization insurance is also being paid by companies these days with the prodding of the unions. It used to be largely a 50-50 share proposition. Now it is becoming more like 60-40 or 70-30.

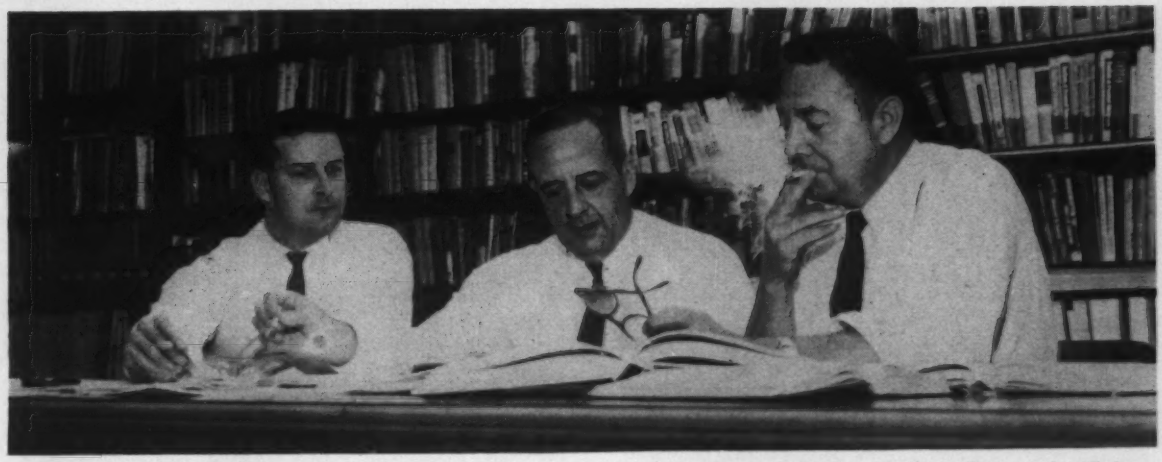
Small Plant Pattern—Although steel industry pensions were increased, this has still not become a major factor in smaller companies. Employees are generally older in small firms. They would rather have an immediate increase.

Across the country, wage settlements for smaller plants are generally following the same pattern, independent of big industry groups —trading money to regain more management.

Chicago Spread—In Chicago this year, settlements so far are running about 8¢. But the top and bottom vary widely—from about 2¢ to 20¢. Fifteen cent settlements are common this year, according to Gordon

A Decade of Wage Gains





CHECKING THE PATTERN: Labor specialists use the research library of Associated Industries of Cleveland to keep up with labor developments elsewhere. Here (left to right) T. L. Murry, AIC research director, R. F. Swander, industrial relations director for Columbian Vise & Mfg. Co., and Ray Vacha, AIC industrial relations director, review and compare labor contracts from Cleveland and other areas.

Hostetter of the Employers Assn. of Chicago.

National Foundry Assoc., Chicago, figures foundry settlements this year have averaged about 7¢ per hour over last year's base. Fringes have advanced 1.5¢. Settlements rose slightly in May to 7.4¢, according to C. T. Sheehan, executive secretary.

Only 12 pct of new foundry settlements are for a one year contract, as compared with 35 pct last year. Management wants longer contracts and is getting them. Deferred increases on long-term contracts signed last year are about 7¢.

Steel Dominates — Manufacturing plants in Pittsburgh naturally tend to follow the dominant industry—steel. But this year workers are getting higher settlements, according to one association report. Of 175 increases affecting 100,000 workers in the area this year, average contract calls for 9¢ to 10¢ per hour plus the steel pattern for fringe benefits.

In Cincinnati, business has generally had a slow year and many of the wage settlements reflect it. It's hard to find 5¢ settlements around the country but there have been quite a few in Cincinnati. The top range is about 8¢. However, fringe benefits continue to be expanded.

Security in Cincinnati—Cincinnati workers are settling for liberalization of existing fringes, rather than any new ones. Insurance plans are one example. About 70 pct of the firms are now paying life insurance on workers, 75 pct pay accident and health and 65 pct pay Blue Cross.

"Next year we expect the same pattern of 5¢ to 8¢ increases," says Burnett Reed, executive manager of Cincinnati Industrial Institute, representing over 200 firms.

Auto Carryover—Detroit had its big three-year contract negotiations in 1958 so things will be fairly quiet until next year. It provided a 2.5 pct annual improvement factor or about 7¢ average, plus increased fringes. Most other contracts in Detroit run 3 years also and follow the auto pattern.

Below Last Year—In Philadelphia this year wage increases are running a little lower than last year —7.9¢ per hour, on a weighted average basis, against 8.6¢ for the first five months of last year. This is based on 57 settlements, covering 22,000 employees, reported to the Metal Manufacturer's Assn. For all of last year, however, the weighted average increase was 7.4¢, a decrease from 7.7¢ in 1958.

Lookout for Statistics—Statistics on average settlements are, of course, eagerly sought by negotiators in other firms. And they're swiftly used by the side they favor. The danger of this was pointed out in Philadelphia by Walter R. Chapel, MMA executive secretary.

"Accurate data on wage patterns is important for industry," he says. "But it should not be regarded as the final answer in settling individual union-company contracts. Averages have a way of becoming accepted as the norm for all manufacturers. Actually what a company can offer and settle for depends on the company itself and its competitive position. It's a matter which should be adjusted by the company and the union in across-the-table bargaining."

West Coast Contracts—Los Angeles labor negotiations have a unique twist this year. Because of dwindling airplane building in favor of rockets, workers are being laid off. So unions have worked out a severance pay arrangement of $50 for every year of service up to 10 years. Increases this year have still been slightly higher than other areas, 8¢ to 10¢.

CLOSE AND FAST: New miniature single spindle automatic by Warner & Swasey will turn out computer and missile hardware twice as fast as manual tools.

MIDGET MACHINE TOOL: New precision lathe by Warner & Swasey will cut original blank down to tolerances of 0.0001 in. with a single chucking.

Midget Tools for Space Market

Small missile and instrument parts need scaled-down tooling for precision machining.

Machine tool builders are bringing out new lines for the promising market. — By T. M. Rohan.

▪ Miniature space age hardware and instruments are opening a new market for machine tool builders.

Latest entry in bringing out a midget line is Warner & Swasey of Cleveland. This firm recently introduced two new midget units for what Walter Bailey, Warner & Swasey president, called "a definite and promising new market for all machine tool builders."

Lighter and Faster—One is a scaled down turret lathe, the No. 2 Micro-Cut, which is more precise than larger lathes, yet faster than precision types because of turret tooling and higher horsepower.

The other is an automatic chucking machine called the O-AC, which will double or triple the output of a manual chucker but still keep space age tolerances and finishes. It can be set up in about the same time as a turret lathe.

The new market has not been entirely ignored so far. And it is relatively limited in scope. There have been both failures and successes which have caused new entries to proceed with caution.

Small Sales Field—A line of midget automatic screw machines was introduced at the 1955 Machine Tool show by a New England builder, but only a few have been sold.

Precision lathes, such as made by Hardinge Bros. of Elmira, N. Y., have been very successful on holding tolerances and finishes. Several hundred of these are being sold annually for fine finishing work.

National Acme of Cleveland has also successfully entered the midget field line with its 7/16-in. multiple spindle bar machine, the smallest machine the firm makes. About 300 have been sold. National Acme will also soon come out with a new 9/16 in. type, the RN 6.

Proof of Market — "You have only to go through Los Angeles area plants to see them using big machines on little jobs to realize what a market there is for miniature tools," Mr. Bailey says.

"This is especially true of grinding, drilling, milling and similar operations. In many cases they are breaking down their operations—moving parts from one machine to another—to hold the necessary accuracy. They make one cut per chucking or use far oversize machines so that the sheer weight will eliminate vibration problems. We expect builders of milling machines, drills and others will soon be getting into it too."

Precise and Able—The new line bridges the gap between the small precision lathe and larger machine tools—in effect it comes down into the precision field but keeps the beef and speed of larger machine tools.

The No. 2 Micro-Cut is as precise as present precision lathes but more powerful and versatile.

It also has eight tooling positions so that it can carry an original blank down to a finished piece.

Why U. S. Has Export Trouble

Both Business and Government Charged with Blame

Export markets aren't dead, but cooperation is needed to develop world outlets.

New moves in government will help out U. S. business in overseas markets. — By K. W. Bennett.

■ Is U. S. business losing out in export markets by default? That was the general idea behind some mild wrist-slapping last week at the second World Marketing Conference in Chicago.

Some top examples:

In Central America, a buyer asked for a U. S.-built rig worth $1 million. He wanted it without the power plant. The U. S. manufacturer refused to break up his package. Result: Europe got the business.

An Australian agreed to buy higher-priced U. S. goods, preferring to get a "Made in the U. S." label in industrial equipment because of the quality reputation. The equipment sent by the export department of a U. S. company, at U. S. prices, bore the label "Made in Japan."

Who's to Blame—These examples cited at the Conference by Dept. of Commerce spokesmen may not be the rule. But they occur too frequently to be called rare exceptions.

If U. S. export is in trouble, who's asleep? Foreign trade people in government accuse business. But some businessmen are tired of getting the blame, say that if anyone is to blame, it's the government.

Other nations subsidize foreign trade, but, they say, the U. S. has smothered it in red tape and high taxes.

Export-Import Bank Acts—But, the government is putting a better foot forward. J. J. Rodway, of the U. S. Export-Import Bank, indicates Eximbank has $2.2 billion available for loans. The Bank will insure U. S. exporters against loss of goods due to foreign political risk at 90 pct of cost.

In a second badly-needed move, the Bank will loan as much as 55 pct of the value of export goods to U. S. exporters.

And the Bank emphasizes that it is particularly anxious to help the small shipper in the $10,000 to $20,000 category.

Cash Needed—A third activity: The Bank has foreign currency for use by U. S. companies who need money in the currency of the area in which they plan to trade.

The Dept. of Commerce, while calling for a more businesslike attitude abroad by U. S. business, hastens to add that many U. S. firms are fighting realistically for business abroad and getting it.

Here are some top world markets, suggested by Dept. of Commerce teams:

Australia and New Zealand: They want U. S. products. The U. S. price is stiff, but they like U. S. quality. The area is booming, needs capital equipment and is buying heavily.

Nigeria: A nation of 35 million people that will emerge as a leader in self-governed Africa. It will pay cash, likes Americans and American goods, but sees little of either. One U. S. businessman dropped in for two days, spent two weeks writing up orders. No dollar restrictions; no import quotas.

Central America: Still a good market, but U. S. producers are losing ground to West Europe and Japan. U. S. products are preferred, but not being sold. Mexico particularly wants capital goods and other Central American nations are good future prospects.

Near East: Oil money is available and capital goods are needed. U. S. prices are not the problem, but longer credit is wanted.

Foreign Buyers on U. S. Export

U. S. firms are slow to answer queries, or don't bother to reply. They are reluctant to quote delivered prices.

Many U. S. companies don't provide adequate equipment service, or technical assistance.

Sales are left in the hands of manufacturer's representatives, who may be loaded with other, often competing, products.

U. S. exhibitors are conspicuous by their absence at trade fairs and expositions. Products are good. Why not show them.

A U. S. label is a symbol of quality. But why keep drumming at the same theme? Why not more data on performance, cost, financing?

U. S. credit demands are too inflexible. The same is true of inflexibility on packaging or order size requirements.

Research: It Isn't too Costly

Small Companies Find They Need—and Can Afford It

More and more small plants find they not only need but can afford research and test labs.

And, if properly set up, the cost isn't as high as you might think.—By K. W. Bennett.

■ Small business is bringing new artillery onto the firing line. The in-plant research laboratory, once the exclusive secret weapon of the big corporation, is becoming part of the small business scene.

Rolled Steel Corp., Skokie, Ill., steel service center, unveiled a quality control lab last week. It's used to test metals for customer specifications. Rolled Steel can get an answer to a buyer within hours. Outside testing takes as long as two days.

But this is only part of the story. The lab cost a modest $10,000. Two men operate it, work in it only part time. Cost of operation is expected to be only $10,000 per year. The lab team spends its non-lab time on in-plant engineering.

The Payoff—First project is a de-greasing unit for cold rolled sheet to meet the stiff requirements of buyers who do lithographing and must have an absolutely clean sheet. The lab team already has two more development jobs waiting when the de-greaser is complete.

A job foundry installed a lab for quality control of castings. It cost $25,000. Operating costs are $15,000 per year. Two men work part time on lab projects, part time on in-plant engineering jobs.

The payoff: In addition to quality control work, the lab does customer research work and has come up with an electrical method for checking graphite dispersion in castings. The work cemented bonds with a major casting buyer, and the foundry is preparing to publish its own research findings.

What It Costs—A small office equipment firm put 2 pct of its annual sales gross into a five man research department. Income zoomed from both reduced manufacturing costs and a parcel of new products. And competitors admit the lab turns out some of the best ideas in the business.

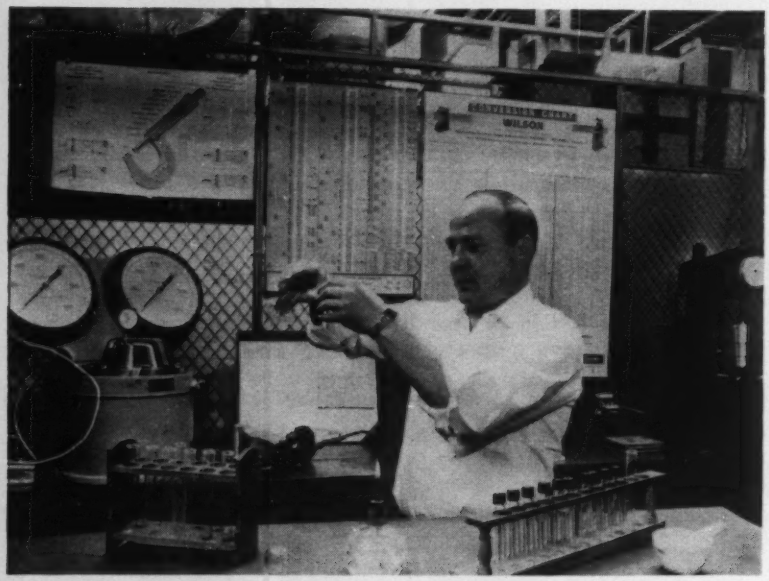
It's been estimated that the minimum cost for an in-plant laboratory is $20,000 per year. Equipment costs run about $10,000 for each $10,000-per-year-worker who uses that lab. It is headed by an "idea man" who gets $9000 to $15,000 a year. He's usually backed up by a younger man who has a B.S. or a M.S. in engineering, but little field experience. He's usually paid about $6000 to $9000 a year.

How It Helps—The two-man lab team will tackle anything from aiding plant engineers in breaking a production bottle-neck, to performing new product research. In large labs, these activities are sharply divided.

But for the small plant, it makes sense. Cost of the laboratory is spread over several plant departments. The lab team is in close contact with top management, manufacturing, and even the customers. They never have to hunt for ideas.

According to D. D. Reeves, Esso Research, use of the research team in business can be measured in increased output. If your capital input is producing about a 5 pct output increase per year, use of a research team to help break plant bottlenecks will just about double the output increase.

Maximum and Minimum — A check by The IRON AGE shows small in-plant labs have been set up



RIGHT PROPORTIONS: Smaller companies, such as Rolled Steel Corp., hold research costs down by having researchers divide their time between the laboratory and other engineering departments.

for an initial equipment cost of only $5000. This is unusual, however. Equipment costs run $20,000 to $30,000. Annual operating costs will probably exceed $20,000. By loaning out lab men to production and engineering department, some companies figure only $10,000 per year as actual lab cost.

U. S. industrial research and development costs, as a per cent of a company's gross sales dollar, average about 1.9 pct. This doesn't include government research expenditures. But small firms with an appetite for growth are pouring as much as 5 or 6 pct into research. One exceptional case goes as high as 10 pct.

Dividing Effort—In some of these cases, the research man admits that he spends as much as 75 pct of his time on work other than development of new products or ideas. Most often he does quality control work, but his jobs include tests for customers, process control work, or development engineering. He's usually a graduate mechanical, electrical, or chemical engineer, with some production experience.

Another wrinkle out of the Big Business book: Use of computers by small 1 to 4 man research labs. Bendix Computer Div., and Royal McBee are moving well into this market with units renting at $1100-$2000 per month.

Four Into Thirty—Royal McBee has at least 400 of its IGP-30's on lease. Bendix Computer indicated last week that it now has 300 G-15's in the field.

A gear manufacturing firm allocates 10 pct of its computer time for its R&D team. A building material manufacturer with less than 100 employees is using a computer for product development problems as well as inventory control and accounting. One four-man engineering team says a computer has given it an output equal to a 30-man team.

One firm is even making money on its lab. It bid, and got, a $100,000 government research contract.

Modernization Key To Defense Budget

New defense budget is $650 million higher than originally asked by the Administration.

Much of the added funds are slated for programs aimed at updating the nation's defenses.

▪ Defense spending for next year —$40 billion worth of missiles, subs, satellites and military hardware in general—is geared to modernization of the entire U. S. war machine.

The new defense budget, about $650 million higher than President Eisenhower asked, is a compromise. It was worked out last week by Senate and House conferees.

The House gave in on most big items wanted by the Senate. But it cut away small bits of many items. In the end there were some surprises.

Asked vs. Authorized—The budget gives the Navy authority to build another conventionally-powered aircraft carrier. It gives the Air Force most of the funds required to put the B70 supersonic bomber into full weapons development status.

There was one important cut. It was a 3 pct across-the-board slash in procurement funds. This trimmed $400 million from the funds approved by the Senate.

The Senate had approved a $40.5 billion budget, and the House had voted $39.3 billion. The Administration's final request was about $39.2 billion.

Give and Take—The House had refused to approve the carrier funds. The Senate had added up the money budgeted for the B70. With an eye toward modernization, funds were provided for both programs. And $244 million was voted for the Bomarc anti-aircraft missile.

The House had deleted all funds for Bomarc except $40 million for research.

A $57 million nuclear powered attack submarine, voted by the House, was approved. However, two destroyer escorts voted by the House didn't appear in the final budget.

Something for All—Army modernization came in for its share. Some $162.5 million more than the President requested was provided in the final budget.

A total of $100 million was allocated for F101 or F106 interceptors. If fighter planes aren't needed, the funds will be added to the B70 program.

The $85 million to finance spare parts and training in preparation for an airborne alert of SAC bombers is doubled.

In another move toward modernization, $200 million has been added to the budget for airlift capacity. It provides that the planes purchased for this program should be of the turbo-prop or turbo-fan types.

Spy-in-the-Sky — The satellite share of the budget was increased $84 million. This is to finance a speed-up of the Air Force's Samos spy-in-the-sky satellite. But it provides that the funds can also be used to speed up Midas and Discoverer satellites, and the Minuteman missile.

There is some explanation as to why the President's request and the House approved bill were so much lower than the Senate's version and the final compromise bill.

Both the request and House action came before the Paris Summit talks collapse and Soviet Premier Khrushchev's subsequent angry threats against this country and its allies.

Steelmark Days Push Sales

Promotion by U. S. Steel pushes retail sales of products made of steel.

Idea will be tried in other cities where the steel industry is a major factor.

▪ During a three-day span this May a retailer in Gary, Ind., sold over 900 galvanized garbage cans. And Gary merchants in general report their sales were up about 20 to 25 pct.

Why? These were Steelmark Days.

Steelmark Days is a promotion of U. S. Steel Corp. It is aimed primarily at convincing the consumer to buy appliances and products made of steel in preference to other materials.

Products Labeled—The program is built around the Steelmark. This is a trademark adopted by the American Iron and Steel Institute. It is meant to tell the consumer that a product so labeled is made of steel.

Richard Paret, head of the committee at AISI in charge of developing and promoting the Steelmark, reports that in the first quarter of its existence over 15 million Steelmark labels and tags were purchased by fabricators, distributors and wholesalers.

U. S. Steel's contention is that steelmakers must actually go to the consumer and tell him what the Steelmark means.

The approach to Steelmark Days is to select a community in which there is a steel plant contributing heavily to its economy. Initial attempts have been in the Birmingham, Ala., area, and in Gary, Ind.

Good in Gary—Mayor George Chacharis of Gary told The IRON AGE that the program in his town was successful, and that he expects it to be even better next year. He points out that Gary is dependent to a great extent on its steel industry. So its citizens make a very receptive audience.

A Corporation spokesman first explains the project to the local chamber of commerce and key merchants to get their cooperation. A coordinating committee is formed to lay out the program for the three-day celebration.

U. S. Steel supplied bumper stickers, posters and window displays.

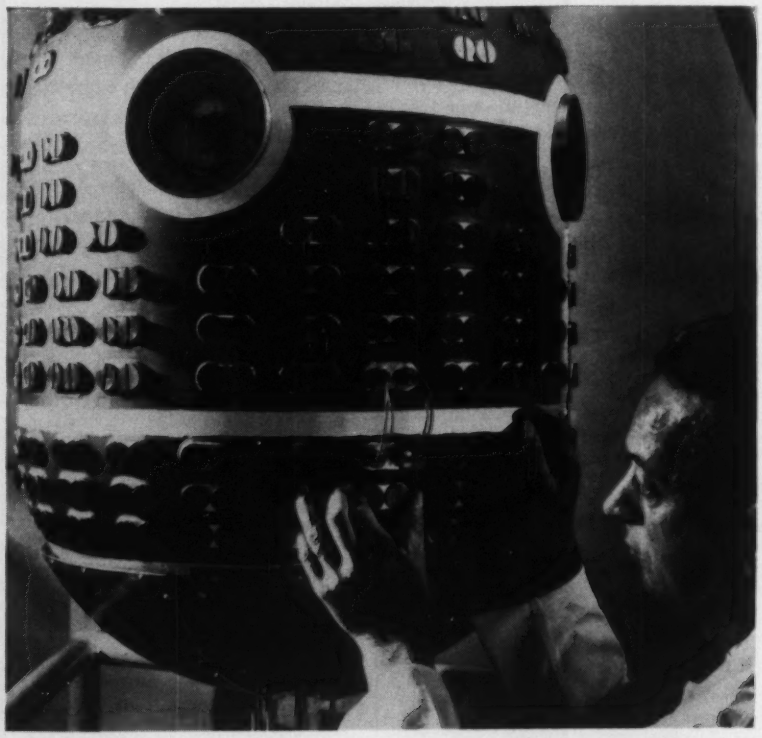
TV Stars and Parades—The Corporation also makes its TV personalities available for radio and TV interviews and for actual promotion right in the stores. The company also supplies mats for tie-in advertising in the local press.

In Birmingham and Gary, there were parades complete with floats and pretty girls, a circus, and even fireworks.

Headed West—The next stop for Steelmark Days is likely to be Provo, Utah, the heart of some of U. S. Steel's western operations. Talks with tradesmen and government in Johnstown, Pa., are underway.

U. S. Steel also expects other steel companies to start similar promotions. A spokesman said representatives of other companies were in Gary and Birmingham observing their Steelmark Days.

It's a SNAP—for Satellites



POWER FROM PELLETS: The Martin Co., Baltimore, is testing SNAP 1-A, a compact, lightweight generator. Heat from tightly-sealed pellets of an atomic waste material, Cerium-144, will be converted directly and continuously into 125 watts of electrical power by hundreds of thermocouples which dot the outer skin of the device. It is expected to power advanced satellites and space probes for at least a year.

Heat-treating problem?
Profit from the experience of these users

Each of these users had a heat-treating problem. Their problems were different, yet they all took the same first step toward a successful solution. They consulted a Hevi-Duty Sales Engineer . . . wisely.

A Hevi-Duty Sales Engineer is a specialist. He is qualified to recommend equipment for an entire heat processing system — does it nearly every day. And when it comes to specifying equipment, he has no ax to grind. He doesn't have to push any special size or type. Hevi-Duty makes them all — electric or fuel-fired, all sizes, all temperatures. And if none of these fit exactly, Hevi-Duty will quickly adapt or design a unit that will.

If you have a heat-treating problem, be sure to call in a Hevi-Duty Sales Engineer. He'll be glad to come in without obligation and you will probably profit from his recommendations.

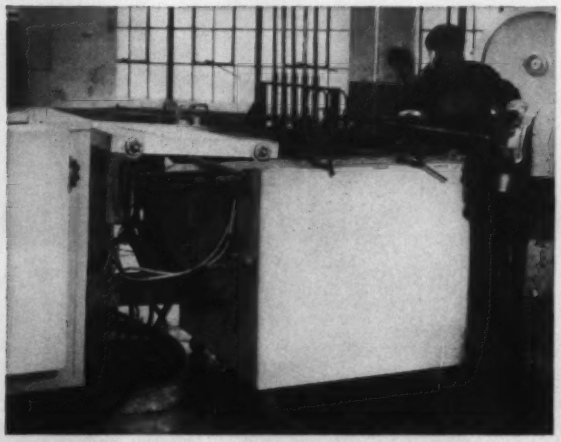
HEVI-DUTY

Electric and Fuel-Fired Industrial Furnaces and Ovens

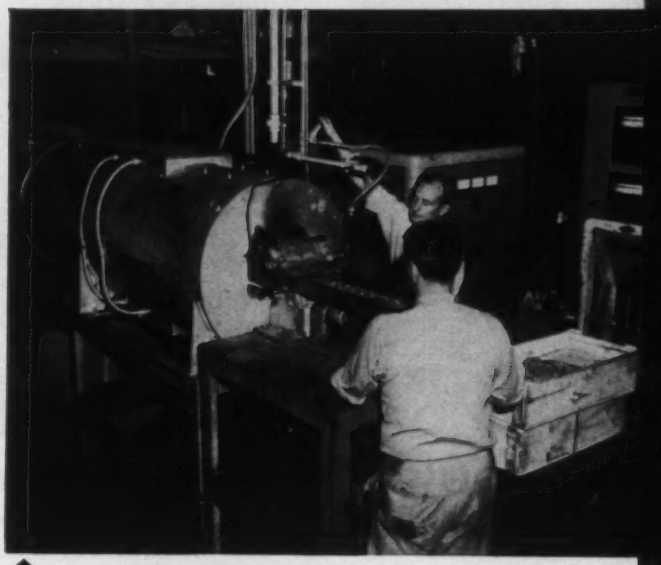
B P C

A Division of Basic Products Corporation

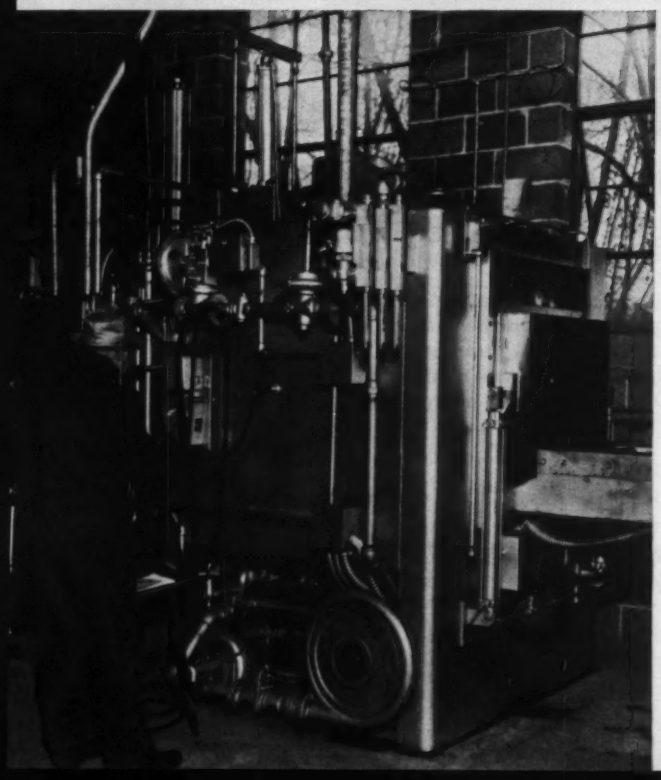
Hevi-Duty Electric Company, Milwaukee 1, Wis.



This immersed electrode salt bath furnace is used at Clevite Research Center, Cleveland. It has a steel pot for low temperatures and a ceramic pot for temperatures up to 2300°F. The furnace is mounted on casters and coupled with a transformer so that it may be used for experimental work anywhere in the shop. ***Please write for Bulletin 655.***



This Hevi-Duty Shaker Hearth Furnace proved to be the profitable answer for Fred Heinzelman & Sons, a New York City commercial heat treater. Small parts are fed onto the hearth and progress through heat and quench cycles automatically. Switching to a shaker eliminated jig and wire time and increased production from 20 to 60 pounds an hour. In addition, the uniform quality of the work has eliminated rejects. ***Please write for Bulletin 1057.***



Ken Ireland, Ireland Heat Treating Company, Orange, Conn., reports a 50 percent reduction in operating costs since switching to this Hevi-Duty Gas-Fired Clean-Line Automatic Heat Treat Unit. One of its jobs is hardening 410 stainless steel knife blades. Knives come out straighter and brighter, with a more consistent hardness than previously achieved. ***For information request Bulletin D-100.***

YOU SAVE ON INSTALLATION AND ASSEMBLY WHEN YOUR "SPECS" READ HYATT

Because it saves assembly time, Hyatt makes all separable races interchangeable. You can press a race on the shaft at one work station . . . join it to any assembly of the same part number at a later stage of production. As a result, you save time and cost when you specify Hyatt Hy-Roll Bearings. Hyatt Bearing Division, General Motors Corporation, Harrison, N.J.

Replacement bearings available through United Motors System and its authorized bearing distributors.

HYATT HY-ROLL BEARINGS

IN ROLLER BEARINGS HYATT IS THE WORD FOR GM RELIABILITY

Dr. Hugh P. Godard

He's a Corrosion Detective

Dr. Godard says the only way to see how aluminum will react to a variety of conditions is to test it under them.

And that's just what he's done. His samples have been placed in many parts of the world and his work has led to better uses of aluminum.

■ When Dr. Hugh P. Godard says he is immersed in his work, chances are he is not using a figure of speech.

Says Dr. Godard, "I have squeezed myself into the small entry port of a ship ballast tank and waded knee deep in water and slime. I have been 6000 feet underground, and at the summit of a peaked roof on a 44-story office building."

The Specialty—Dr. Godard is head of the chemical division of Aluminium Laboratories Ltd., the research arm of Aluminium Ltd., the Canadian aluminum producer. His specialty is corrosion.

"Since the corrosion behavior of a metal is not a fundamental property, such as strength or specific gravity, it is necessary to test aluminum in the actual environments in which a corrosion advantage is claimed," Dr. Godard says. "It is not possible to duplicate these environments in a laboratory."

For Best Results—"Nor is it possible to predict service performance from such laboratory corrosion tests as are available."

Dr. Godard's program calls for testing aluminum, in various shapes and alloys, in marine, industrial and rural sites. Since 1948 he and his staff have been placing samples all over Canada and the U. S.

DR. H. P. GODARD: His laboratory is everywhere.

And he has run small scale tests in Japan, England, Singapore, Sable Island in the Atlantic, Guatemala, Karachi, Los Islands in the Republic of Guinea, and Lago in Nigeria.

Long Range Work—Dr. Godard's approach to corrosion testing has guided him into the long range view. For instance, now he and his staff are examining samples that were placed back in 1950. Some examples are marked for examination in 1999.

His eye to the long-range has not affected Dr. Godard's interest in what is happening in his field right now. One of his pet projects is his classification system for material on corrosion.

"It enables us to keep up to date on what others are doing," he notes. "It also places published information at our fingertips and speeds preparation of replies to practical questions."

Full Files—Dr. Godard's files now contain over 4500 entries on the behavior of aluminum in contact with hundreds of materials.

What has all this extensive probing taught this expert on aluminum corrosion?

"Our experience to date indicates that most troubles arise from improper choice of alloys and poor design of equipment due to either inadequate planning or faulty construction. Rarely has aluminum failed to do the job claimed when properly chosen and applied."

This is a throat insert for the nozzle of a solid fuel rocket engine—and it is made possible by a dramatic new isostatic pressing and sintering operation at Sylvania. This operation enables Sylvania to make full use of tungsten, molybdenum and their alloys. It assures rocket and missile manufacturers of a steady and dependable source of supply for the desired refractory metal blanks and ingots.

Forging blanks are no problem for the Sylvania isostatic presses and sintering furnaces; nor are preform blanks for machining or electrodes for arc casting. Sylvania is also equipped to "green machine" the blanks or furnish them to exact finished tolerances.

If refractory metals are your materials, and special shapes, sizes or quantities your problem, you'll find the quality and price Sylvania offers to be of distinct advantage. For details, call your Sylvania representative, or write Chemical & Metallurgical Division, Sylvania Electric Products Inc., Towanda, Pennsylvania.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS**

After the Squeeze Is Over—

Almost all of the possible water has been squeezed out of the economy as second half starts.

But indications are that a big durable goods recovery won't come automatically.

■ Back in the first half of 1959, you could sense there was a lot of water in the economy. Led by strike hedging in steel, much of the business activity was generated by advance buying.

Just the opposite is the case today. And this is likely to be the situation through most of the summer. Instead of injecting "water" into the economy by extending buying plans, business is squeezing everything it can out of the economy.

No Advance Buying — Inventories today are considered a liability. Forward commitments of any kind are looked on with suspicion.

This is one reason why it's hard to assess what is going to happen to business in the second half of this year. Just like the question in 1959 involved artificial plus factors, the question now is how much of the low rate of new orders is due to artificial negative factors.

Durables Hit — You notice it most in the steel industry and in consumer durables. While inventories at the moment are not high, there is still a lot of cutting to do.

Some people who have been through this before are more optimistic about recovery than others.

"I've seen it before," is a typical comment. "They always cut back too far. Then, when business picks up, they have to order for their production and at the same time try to build up inventories. That's why I say the recovery will be better than most think."

Like 1958?—Is this sound reasoning? It's hard to tell. There are no indications of a general recession—as yet. Of course, if something like 1958 is repeated, the overall level of business can stay relatively high while metalworking gets hit hard.

If that's the case, you'll hear a lot of talk about those "easily deferred" purchases of consumer durables. While this is going on, the manufacturers of non-durables and the service industries will be heading for new highs.

One Projective—One of the more reliable business forecasters predicts a drop of four points in the Federal Reserve Board Index of Industrial Production between the first quarter of 1960 and first quarter 1961.

During that time, the durable goods index is expected to drop five points. Non-durables are expected to go up two points.

The same group predicts spending for durable goods to decline from $47 billion (annual rate) in the second quarter to $44 billion by the first quarter of 1961. But spending for non-durables is expected to increase by $4 billion (annual rate) and spending for services by the same amount.

Leveling Off—This is not considered an unduly pessimistic forecast. If the FRB Index stays between 108 and 109 throughout the year, that is not too bad overall.

The significant thing is that it rules out a major second half upsurge in the economy. Instead, it indicates a leveling off for some time.

Employment Problems Ahead

■ Looking farther ahead, manpower authorities believe the emphasis on service industries is likely to increase.

Ewan Clague, commissioner of labor statistics for the Dept. of Labor has some pronounced ideas on this point.

In a University of Michigan lecture, he points out that the great expansion of workers employed in service industries and relative decline in those producing goods is expected to increase.

Higher Standard of Living—"The rise in service employment reflects the rise in the standard of living," he says. "Expansion of the service industries only can occur when the basic needs of food, clothing and shelter have been met."

While all this looks good for recreation and leisure, it may mean some hard knocks for the durable goods makers.

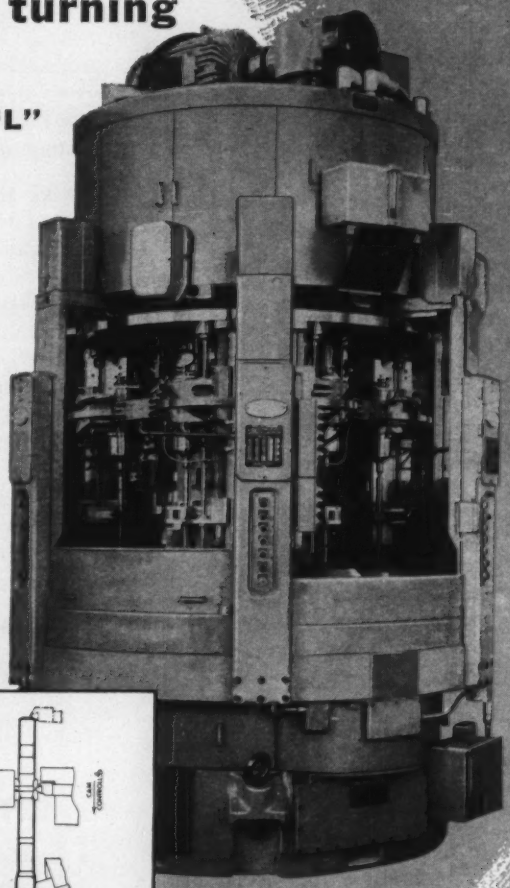
Slower Growth — Mr. Clague says it will be impossible for the U. S. to achieve a 5 to 6 pct annual growth rate by 1970.

Because the older and younger members of the labor force must be ready to fit themselves into new occupations, Mr. Clague makes the conclusion that the educational system, including apprenticeship and training, is the heart of the manpower problem.

Productivity

with a BULLARD center turning

MULT-AU-MATIC TYPE "L"

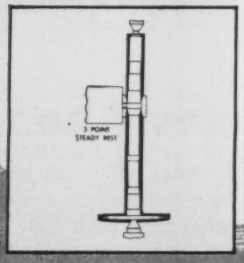


Over the years, many improvements in design and engineering have been incorporated — until today — the Bullard Center Turning Mult-Au-Matic, Type "L" is built to produce for your highest productivity and efficiency.

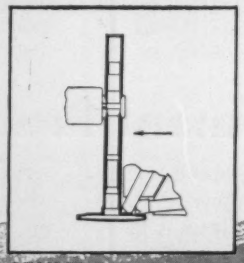
This machine is available with 6 or 8 spindles, single or double index, with either 10" or 14" diameter chucks. Spindle speeds of 56 to 1250 R.P.M. can be furnished and individually selected for each working station. Feed rates, between .0025 and .0625, can be individually selected for each working station.

Thus, to insure maximum productivity of the machine, you have individually selected spindle speeds and tool feed rates at each station. Further, it permits the use of modern cutting tools, methods and materials which also contribute to reducing your machining costs.

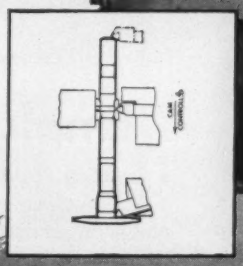
Prior to the Bullard operation, pieces have been center drilled at both ends and steady rest spot ground to support the shaft during turning cuts.



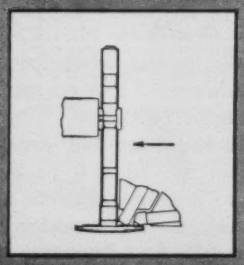
STATION 1 Loading and unloading.



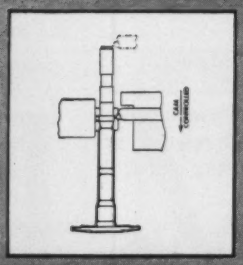
STATION 2 Rough facing of flange.



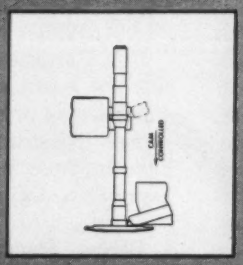
STATION 3 Rough turning of stem diameter — full length of shaft.



STATION 4 Finish facing of flange.



STATION 5 Finish turning of stem diameter — upper part of shaft.



STATION 6 Finish turning of stem diameter — lower part of shaft.

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Luxury Cars Retain Their Appeal

There'll Be New Models and Other Changes for '61

Cadillac, Lincoln and Imperial are selling better than they did a year ago.

And there are enough changes planned for next year to assure buyer interest.—By A. E. Fleming.

▪ Compact cars are doing very well. But they aren't going to replace luxury models. At least not in the next year.

Assurance comes from Cadillac, Imperial and Lincoln that 1961 models are on the way. There will be some changes made too.

Like other General Motors Corp. divisions, Cadillac will reduce the size of its 1961's a bit. This means they'll be a little shorter, slimmer and lighter. But they'll be higher.

Brougham Lines—For an idea of what the regular line Cadillacs will look like next fall, take a close view of the 1960 Eldorado Brougham, the $13,075 4-door hardtop. This will be the 1961 styling theme for the regular Cadillac series, including sculptured side panels with flared out lower door panels and lower rear quarter. The Brougham's rear styling, including a unique bumper and light treatment, will be adapted to the other models.

All through winter and spring there has been chatter about Cadillac's 1961 transaxle system, the rear transmission device that requires linking to the front-mounted engine. It's now feared the transaxle has had it as far as 1961 model introduction goes. Maybe it may come next spring, or as a 1962 model innovation. But there have been too many engineering problems to have it ready by fall.

Smaller Luxury Cars — There won't be much of a switch in Cadillac's lineup in 1961. A sports hardtop is going to be added. Shorter than present standard models, the wheelbase will be less than 124 in. It's now 130 in. The back end will be chopped to accommodate Cadillac buyers who've complained of parking perplexities in recent years.

Lincoln will shake things up a little more. The middle series called the Premiere will get the axe. Lincoln and Continental names will stay. A smaller model will bow as a Lincoln. The Continental name will grace hardtops, sedans and a novelty to the trade, a 4-door convertible. A rear window automatically controlled from the dash panel will be a convertible feature.

Service Shocker—And there will be a real shocker in the area of service guarantees, according to various reports. This will be a guarantee against service failures for the first 30,000 miles of operation.

The Imperial will have fewer alterations. Although Chrysler Corp. is preparing new aluminum engines, the Imperial won't get one. The 350 hp V-8 will be kept; so will the 129 in. wheelbase and body-and-frame construction.

Imperial is expected to get a unitized body for 1962. Like all other makes, however, it will get an alternator next fall, the generator substitute that showed up for the first time on the Valiant.

Then and Now—Production for the 1960 calendar year is short of spectacular. But model year sales are satisfying.

The trio turned out a combined

Willys Dresses Up Jeep Station Wagons

DRESSED UP: Willys Motors' 1960 Jeep station wagons feature new chrome trim styling, a one-piece rear window and a range of bright new two-tone colors. Prices start at $1995 for the new line.

total of 106,000 cars in the first half of 1960. This is about 8000 fewer than a year ago. Cadillac is equal to last year, Imperial 3000 cars behind, and Lincoln trails by 5000. They're down to 3 pct of U. S. car output compared to 3.5 pct in all of 1959.

But sales are doing well. Cadillac retail deliveries were 66,900 units in the first five months of 1960. It was an all-time high for Cadillac for the period, bettering the 65,400 mark set last year.

Lincoln model year sales through May were 17,200 compared to 17,100 in the 1959 model year through May. Imperial sales of 1960's through mid-June were 13,300 against 12,500 at the same point in the 1959 model year.

Ford Offers New Delivery Van

Ford Motor Co. has come up with a second compact truck. Earlier this year the company introduced the Falcon Ranchero, a delivery model using most of the Falcon car's parts and components.

Last week Ford brought out a parcel delivery truck with an abbreviated wheelbase of 96 in., 13.5 in. less than the Falcon's.

Price Is Right—The new model is designed as a stripped chassis, so it can be used with a variety of special bodies required by parcel delivery operators. Ford says it will be the lowest priced delivery chassis in the country.

Road Commissioner Likes Big Cars

An argument is going on in Michigan over compact cars.

State Highway Commissioner J. S. Mackie doesn't like compacts. He says they're not safe on highways, don't give adequate road visibility, their headlights are too close together and they're messing up his budget because of reduced tax revenues. Besides, he believes compacts won't take hold in the long run.

Hearing of the commissioner's complaints, Roy Abernathy, American Motors Corp. vice president of automotive distribution and marketing, took a deep breath and replied:

"Four-hundred major U. S. insurance companies don't agree with Mr. Mackie on the compact's safety. They offer 10 pct lower rates for compacts on the basis of greater safety and lower collision repair costs."

Measure Up—Then he replied to two of Mr. Mackie's specific examples. "Mr. Mackie says 3.5 ft is the minimum desirable driver eye level. It's 4 ft on the Rambler. As for headlights being too close together, our standard compact Rambler headlight width is 58 in. Many trucks on Michigan highways are less than 54 in. apart. Some large cars are only 52 in."

Puzzled, Mr. Abernathy concludes, "It's strange to hear a highway commissioner call for more weight, a big factor in road deterioration, and more bulk, in the face of the traffic congestion that's running far ahead of road construction."

Seaway Savings

Seaways as well as highways are of interest to American Motors. The corporation recently was involved in a good example of how the St. Lawrence Seaway is reducing shipping costs.

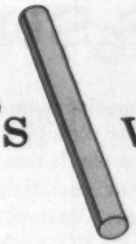
A shipment of 50 new Ramblers for Kuwait, Arabia, was loaded at the port of Kenosha, Wis., on Lake Michigan and moved out over the Seaway. The company saved more than $6100, or $122 a car, compared to the cost of shipping overland and through ocean ports, according to W. S. Pickett, director of automotive export. "World trade can't help but benefit from such savings," he says.

GE Offers Transistorized Two-Way Radio

MOBILE RADIO: A new 100-watt vehicular communications unit, small enough to be mounted under the dash in most cars and trucks, has been introduced by General Electric Communication Products Dept.

Anaconda Memo to Management

This is a penny's worth of bronze



It's a piece of Anaconda welding rod that could be worth its weight in gold to you. It might save you a big capital investment or important production time by salvaging equipment that seems beyond repair. Take the experience of Jessup Steel Co., for example. A while back their production stopped dead in its tracks when the 60-ton semisteel base of a big forging hammer fractured. A replacement base? Of course—in nine months. Jessup called specialists in repairing heavy machinery. The base was repaired by braze welding in a week —at 20% of replacement cost. About a ton of Tobin Bronze®-481 rod was used. But sometimes a few ounces can make equally significant savings in building up worn surfaces or repairing a broken part that has immobilized a big machine. *And don't overlook braze welding in production.* It's a practical way to get flexible, low-cost production assembly of tubular and sheet steel products —like furniture and appliances. American Motors uses it to add strength, prevent squeaks, leaks, and rattles in unit construction of the Rambler's body, supplementing electric welding in some 30 areas. Anaconda-997 (Low Fuming) Bronze Rod has proved to be the best welding rod for these production uses.

We'd be glad to send you (or anyone else in your company) a copy of Publication B-13 which gives detailed and practical information on Anaconda Welding Rods in repair and production jobs. If you have a special problem, the services of an Anaconda specialist are at your disposal. Write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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WELDING RODS

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CINCINNATI

FILMATIC

Let's get this straight

Rocker arm shafts look simple enough. However, their simplicity hides tough production problems, the kind solved best through long experience. Consider accuracy of straightness, for example. It must be of the highest order, but it's not easy to attain. Prior operations bow the shafts slightly; grinding must restore straightness. Cincinnati Grinding Machine Division Specialists know how to handle this problem; many highly successful production lines are evidence of their experience. The latest Cincinnati Centerless line for grinding these shafts is illustrated below. The line is equipped with quality control feature-advantages including automatic grinding wheel balancing, automatic diamond turners, push-button automatic truing, and automatic gaging on the last machine. Conveyors integrated with the machines keep the parts moving.

As in every installation, Cincinnati takes full responsibility for all the equipment, whether it's a multi-operation production line or a single automated machine. The Grinding Machine Division's variety of machines and years of experience are tops in the field. Take advantage of them! GRINDING MACHINE DIVISION, THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO.

ROCKER ARM SHAFTS *are precision ground to a high degree of straightness in passing through this line of four* CINCINNATI FILMATIC *Centerless Grinding Machines. Production, 167 per hour.*

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Industry Tax Cuts Shelved

Tax Bill Will Not Come Up for Another Year

Only change in new tax law calls for tougher depletion allowances for extractive industries.

Administration breathes easier as $4 billion stays in treasury.—By R. W. Crosby.

▪ Cuts in industry's share of the nation's taxes have been postponed for another year.

The new tax law, shaped by a Democratic Congress to suit the taste of President Eisenhower, blocked for another year a reduction to 47 pct in the existing 52 pct corporate tax rate.

The revenue measure, which also blocks any cuts in excise tax rates, kept $4,000,000,000 from being chopped out of the Treasury. The excise cuts postponed for a year were taxes on liquor, cigarets, new automobiles, auto parts and accessories, and travel fares.

Mining Hit—Only one change was made in the previous tax structure. It specifies that depletion allowances for mining and other extractive industries cannot be computed on the value of finished manufactured products.

Depletion Allowance—The mining, clay, oil, and other extractive industries have been permitted to reduce taxable income by amounts equal to a specified percentage of the value of their output. This so-called "depletion allowance" ranges as high as 27½ pct in the case of oil.

The new law limits the treatment processes which may be used to add value to a raw material before computing the depletion allowance.

The previously scheduled corporate and excise tax cuts have now, as requested by the Administration, been postponed until July 1, 1961.

Tank Buying Eyed

Congress is getting hotter and hotter over the military's handling of contracts.

Congressmen don't like the idea of giving a multi-million dollar award to a contractor without seeing what the competition has to offer.

The latest flareup came from House investigators looking into Army tank buying procedures. They quizzed Ordnance officials about why a $500 million contract was made with Chrysler Corp. in 1950.

Rep. Porter Hardy, Jr., D., Va., who heads the investigation, said the selection of Chrysler to produce 548 M-47 tanks and six pilot models of the M-48 tank had apparently been done without determining whether other companies were competent to do the job.

Kickback Ruling

Penalties for kickbacks from subcontractors to prime contractors are being extended to all negotiated government contracts.

The previous kickback ban outlawed the granting of gratuities or gifts by subcontractors under cost-plus-a-fixed-fee government contracts only.

Under the new ban, any person who either gives or receives kickbacks on negotiated government contracts will be liable to a fine up to $10,000 or imprisonment for not more than two years or both.

Tougher Depreciation Ruled

▪ The Supreme Court has ruled that for rapid depreciation purposes, the useful life of an asset such as equipment is measured by the taxpayer's holding period not the asset's entire life.

Government Victory—The ruling is a victory for the Federal government over private companies. The high court upheld the government's position that the term "useful life" is limited to the time the equipment or other capital goods is used by the company claiming depreciation.

Two decisions on this issue were announced by Justice Tom C. Clark. They involved depreciation allowances for automobiles used in rental service.

Useful Life Limit—The taxpayers wanted to use the so-called "declining balance method" of depreciation, which permits higher depreciation in the earlier years of the assets's useful life and lower deductions later. Treasury regulations provided that this method could be used only if the asset has a useful life of at least three years.

Cars that are rented are sold rapidly and not often held three years. The companies wanted the regulations interpreted to apply to the entire life of the car. Otherwise the rapid depreciation method would not be available to them.

The Supreme Court rejected this argument.

Are Tool Buyers Marking Time?

They Could Be Waiting for the Machine Tool Exposition

Some tool builders believe buyers may be holding off to see what developments will be unveiled in September.

Meanwhile, foreign orders continue to support the machine tool industry.—By R. H. Eshelman.

■ Just released, May figures for machine tool orders raise some interesting questions. Both domestic cutting tool sales and those of forming types are down. Meanwhile foreign orders in both categories are on the rise, according to the National Machine Tool Builders' Association.

Some builders feel the lag in domestic orders is due to hand-to-mouth buying. And some potential buyers may be waiting to see what will be unveiled at the Machine Tool Exposition in September. Traditionally there's a surge of activity after the shows, especially in standard lines.

Big Spenders—But the big spenders, especially automotive, buy according to anticipated needs. And most of their requirements are for special machinery. In this area 1960 has been disappointing. The exception has been tools for the new compact cars.

Some big programs may break loose in the automotive field this summer or early fall. But special equipment tends to follow an independent pattern because of tailored engineering.

Deferred orders, then, may be a factor in standard lines where capital programs aren't urgent. Privately, few builders expect a great boom in the latter quarter. However, many seem to expect a business pickup after September.

The Positive View—One Detroit area builder of standard machines admits his company is already experiencing a mild rise. After a let down in April, May and early part of June, he notes, orders are bouncing back to a higher level. His shop is now operating about at capacity. Even if business only marks time during the usually slow months of July and August, he can foresee a very good year.

Another maker of special machines sees his business staying at the present level which is the best in several years, at least until January. Contrary to gloomy forecasts of some economists, he feels 1961 could start with a rush. Some of this optimism may stem from persistent reports of big automotive changes for 1962.

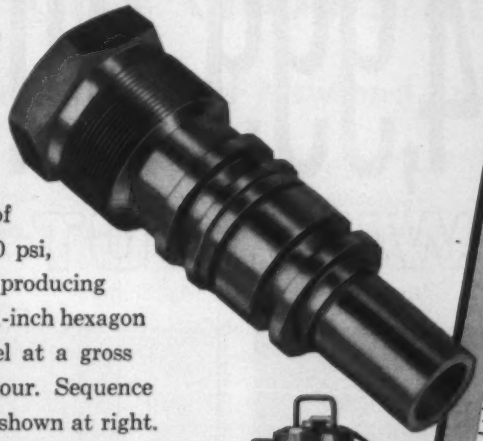
Overseas Business — Meanwhile foreign orders have become increasingly important. Tool builders say these orders may stem from long deliveries being quoted by European builders. Prosperity in Western Europe and Japan seem to have saturated their machine tool plant capacity.

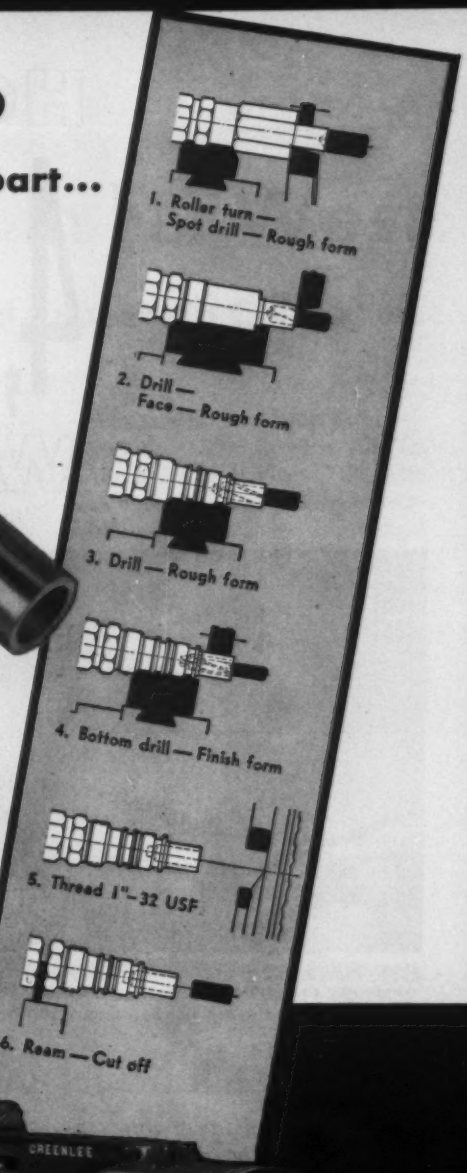
Large Forging Undergoes Tests

ULTRASONIC TEST: This 44-in. rough machined forging is undergoing ultrasonic testing at Westinghouse Electric Corp. before finish machining. It will be used in a 22,000 kw gas turbine.

GREENLEE AUTOMATICS SPEED PRODUCTION of precision pump part...

The part is the injector cylinder of the Greenlee No. 798 High-Pressure Portable Power Pump manufactured by Greenlee Tool Co., a division of Greenlee Bros. & Co. Since the pump is capable of developing pressures up to 10,000 psi, extreme precision is required in producing the cylinder. It is machined from 1-inch hexagon 4150 chromium-molybdenum steel at a gross production rate of 48 pieces per hour. Sequence of the 13 operations performed is shown at right. Your Greenlee representative will be glad to help solve your precision part problems... just send us a print.




1. Roller turn — Spot drill — Rough form
2. Drill — Face — Rough form
3. Drill — Rough form
4. Bottom drill — Finish form
5. Thread 1"–32 USF
6. Ream — Cut off

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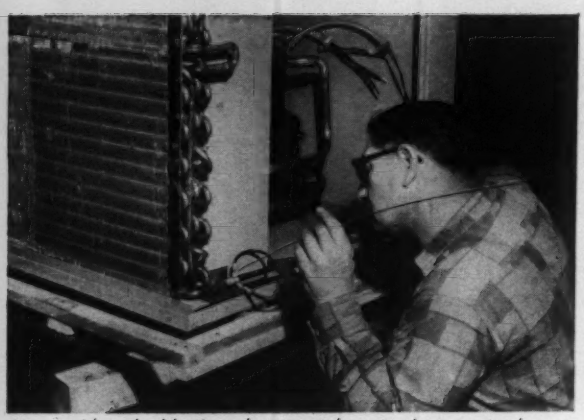
HOW TO MAKE 4,999 JOINTS WITHOUT FAIL



Here, with a double tipped oxyacetylene torch, operator brazes condenser coil joints. This condenser-compressor assembly contains 30 hook-up joints, not counting return bends.

The unit evaporator, located inside the house, contains 36 hand-brazed SIL-FOS 5 joints.

International Heater Does it With HANDY & HARMAN SIL-FOS 5

Production statistics of this manufacturer of heating and air-conditioning equipment show that perhaps *one* in five thousand hand-brazed joints may need touching up. This is a micrometer measurement away from absolute perfection.

One of the Utica, New York, company's products is a home air conditioner that utilizes the existing duct work of the structure's hot-air furnace. Its novelty lies in the fact that the unit's compressor and condenser are located outside the house for noise-free coolness inside the home.

The unit's evaporator is installed on top of the furnace for simple tie-in to the plant's ducting for hot-weather operation.

Shown here in production is International's Model 5-5B of 5 ton capacity.

This "joint in quantity" record is being duplicated by SIL-FOS 5 silver alloy brazing in the manufacture of heating, air-conditioning and refrigeration equipment everywhere. Its strength, air- and leak-tightness and ease of application are some of the reasons that make Handy & Harman SIL-FOS 5 brazing one of the *surest* metal joiners in existence. We'd like you to know more about SIL-FOS 5 and the job it can do for you in joining copper and copper alloys in any shape, size and complexity. Our Bulletin 20 deals with this in a complete and informative manner. A request to Handy & Harman, 82 Fulton Street, New York City 38 will bring you your copy.

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Metalworking Grows in Far West

Here's a List of New and Expanding Companies

More new companies are setting up shop in California. Others are expanding.

The latest list includes everything from outdoor furniture to outer space.—By R. R. Kay.

▪ Aerospace and electronics show up big in the current crop of new and growing California companies.

Many other product makers are coming, too. They're broadening the base and hustling along the Far-west's industrial maturity.

New, bigger, or better plants are in the works for these firms; and they're prospects for metalworking goods and services.

Buses and Spacecraft — Crown Coach Corp., Newhall-Saugus — a $1 million factory to make buses and fire engines. Nearby, Western Equipment Co. will make earth scrapers; Lockheed Aircraft Corp., electronics and propulsion systems for spacecraft.

Autonetics Div. of North American Aviation, Inc., Compton — automatic checkout equipment, computers; navigation, armament, and flight control systems. Nortronics Div. of Northrop Corp., Palos Verdes—space systems and components.

Pendleton Tool Industries, Inc., Los Angeles—hand tools. Dashew Business Machines, Inc., Culver City—metal embossing equipment.

Pools and Taglines—The Hufford Corp., El Segundo—machine tools, aircraft and missile assemblies. Shasta Trailer Co., Northridge—vacation-type trailers. Miller Swivel Products, Inc., Pomona —ball bearing swivels, automatic taglines.

Eastside Mfg. Co., Montebello—pumps and swimming pool equipment. Sierra Engineering Co., Sierra Madre—surgical equipment. Texas Aluminum Co., Mojave—aluminum windows, doors, aircraft parts.

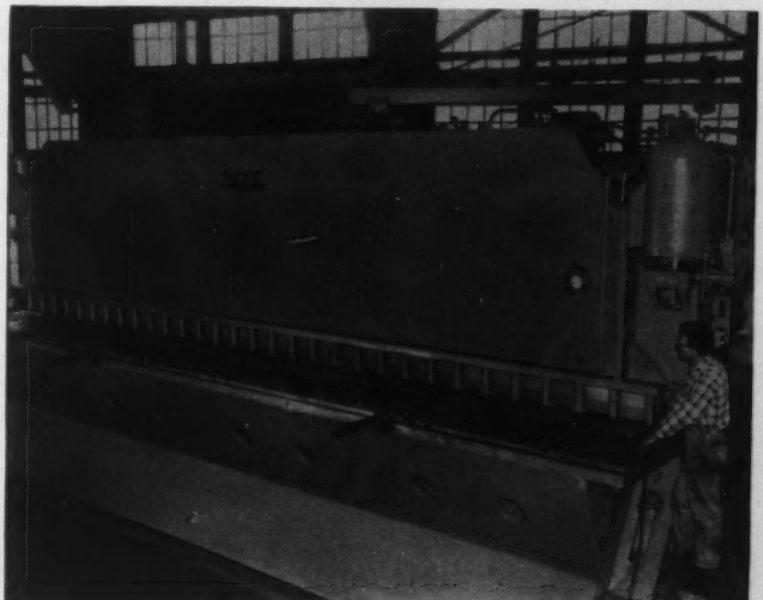
Worley & Co. Div. of Ecko Products Co., Whittier — steel lockers and metal shelving. Republic Supply Co. of California, Los Angeles —oil field and industrial supplies. Vacco Valve Co., El Monte. Greer Hyraulics, Inc., Los Angeles—aircraft equipment.

Electronics and Play Swings—Virtue Bros. Mfg. Co., Los Angeles —metal dining furniture. Calpatio Co., Inc., Monrovia—outdoor furniture, swings. United Centrifugal Pumps, San Jose.

Food Machinery and Chemical Corp., Santa Clara—research and engineering center. Custom Systems Corp., Santa Ana—electrical cable systems.

Electronic equipment makers: A.C. Spark Plugs Electronic Div., Los Angeles; Western Transistor Corp., Gardena; Power Instruments Corp., El Segundo; Space Electronics Corp., Glendale.

Largest Shear Is Built in California



SHEAR POWER: Largest plate shear ever built is the claim of Pacific Industrial Mfg. Co., Oakland, Calif. It built the shear, capable of shearing one-half in. steel plates over 30 ft long in a single stroke, for Daniels Standard, Nashville, Tenn.

INDUSTRIAL BRIEFS

All in Favor—D. L. Harwood, has been elected president, Purchasing Agents Assn. of Chicago for the 1960-61 term. He is vice president, purchasing and material control for Fairbanks, Morse & Co. Mr. Harwood has been with the company in their purchasing departments at Three Rivers, Mich., Beloit, Wis., and Chicago offices since 1926.

Three R's Automated—Western Design, Div. of U. S. Industries, Inc., has received from the U. S. Air Force a contract for 18 automatic teaching machines. Called the AutoTutor, the automatic machine is designed to increase speed and accuracy of learning. It will be tested by the Air Force in training in basic electronics.

Award Given—Reuben Lee of Westinghouse Electric Corp.'s electronics div., Baltimore, Md., has received the company's Order of Merit. He has been cited for his technical accomplishments and the development of the first radar pulse transformer. Mr. Lee holds 25 U. S. patents and has published 32 articles in various technical and professional journals.

The Dotted Line — Johnson Bronze International, Inc., subsidiary of Johnson Bronze Co., New Castle, Pa., has signed a licensing agreement with Sintermetal, S.R. L. in Buenos Aires, Argentina. Sintermetal manufactures bearings and bushings. Johnson Bronze will furnish technical data, engineering assistance and permit Sintermetal to use the Johnson name.

Book List—A new revision of the Recommended Practices for Metallizing Shafts or Similar Objects, has been published by the American Welding Society. The 32-page booklet is divided into four sections: General, Surface, Preparation, Spraying, and Finishing. It is available for $1, postpaid from AWS, Dept. T, 33 W. 39th St., New York 18, N. Y.

New Title—The American Management Assn.'s Office Management Div. has changed its division's name. It will be known as the Administrative Services Div. The division's program covers the following areas: Office administration, data processing, systems and procedures, administrative planning and control, management information and reporting systems, and management engineering and sciences.

Orders Roll—Electric Motor and control equipment for Alan Wood Steel Co.'s new 110-in. plate mill has been ordered from Westinghouse Electric Corp. Worth about $3 million, the equipment will drive the rolls of the mill to be located near Conshohocken, Pa. The mill will roll plates of carbon and alloy steels up to 96 in. wide and 4 in. thick.

Southern Foote—Foote Mineral Co., Philadelphia, will build an electrolytic manganese facility at its New Johnsonville, Tenn., plant site. The 20 million lb per year plant will represent a capital investment of over $6 million. It will be built in two stages. The first unit of 10 million lb per year is expected to be in operation in late 1961 or early 1962.

"About this $800 item on your expense account. The Internal Revenue Service asks a more detailed explanation than 'wowie'!"

Doors Open—Pennsalt Chemical Corp. has completed its new 34,000 sq ft chemical specialties plant in Atlanta, Ga. It is the fourth warehousing and distribution center designed and built by Pennsalt since 1955. The facility will serve the Southeast with its full line of products for major industries.

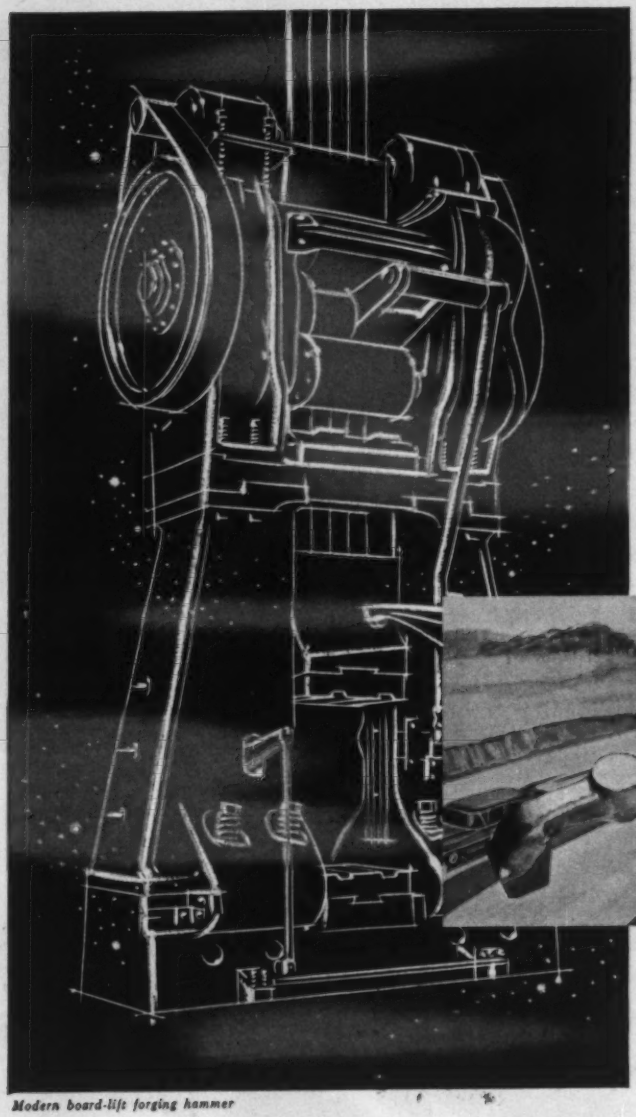
Bought Up — Wanskuck Co., Providence, R. I., acquired the Production Machine Co., Greenfield, Mass. The company will continue to operate in Greenfield with its existing personnel. The Production Machine Co. makes grinding, polishing and buffing machines using abrasive belts.

New Climate—The Heald Machine Co. is expanding facilities at its plant in Worcester, Mass. Expansion involves assembly and testing numerically controlled machine tools. A special air conditioned and humidity controlled enclosed area will be built inside the Heald plant for assembly and run-off testing of the machines.

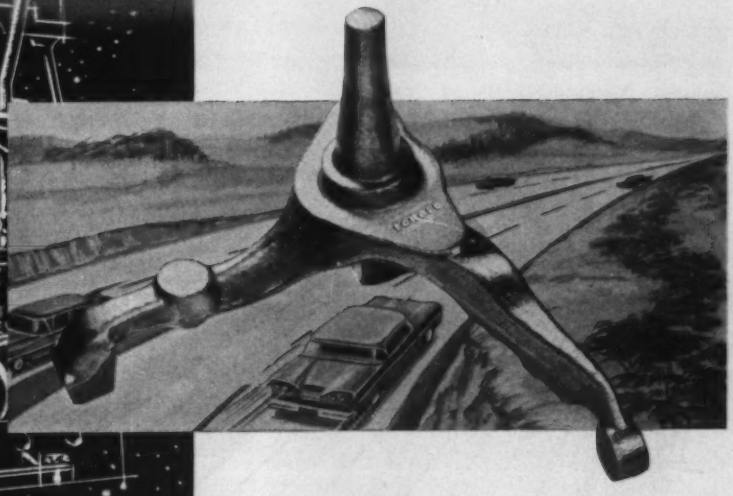
Aluminum Shot—A casting machine capable of producing 3600 lb of prime deoxidizing shot per hour is being installed at Kaiser Aluminum & Chemical Corp.'s Mead, Wash., reduction plant. Aluminum shot is used by the steel industry for deoxidizing steel and by companies making special nonferrous alloys. The casting facility is scheduled for operation about August 1.

Named President—B. D. Bennett has been named president of the Wire Reinforcement Institute. He is manager, construction material sales, American Steel & Wire Div., U. S. Steel Corp.

Plan New Office—A new office building will be built in July for the Wire and Cable Div. of Copperweld Steel Co. It will cost about $25,000 and will be located on Ninth St. in Glassport, Pa. It is scheduled for completion in the spring of 1961 and will house the division's headquarters staff.



SHOCK-STRENGTH of steering spindle soars by designing it to be forged



Modern board-lift forging hammer

By designing front-end spindles to be forged, automobile and truck manufacturers practically eliminate danger of failure of these vital parts, even under sudden turning stress that can reach thousands of foot-pounds.

Start your designs by planning to use forgings everywhere there's a high degree of stress, vibration, shock, or wear. Forged parts withstand them all better than parts made by other fabrication methods. And forgings have no hidden voids to be uncovered after costly machining hours have been invested ... the hammer blows or high pressures of the forging process compact the *better* forging metal, make it *even better.*

Write for literature on the design, specification, and procurement of forgings.

When it's a vital part, design it to be FORGED

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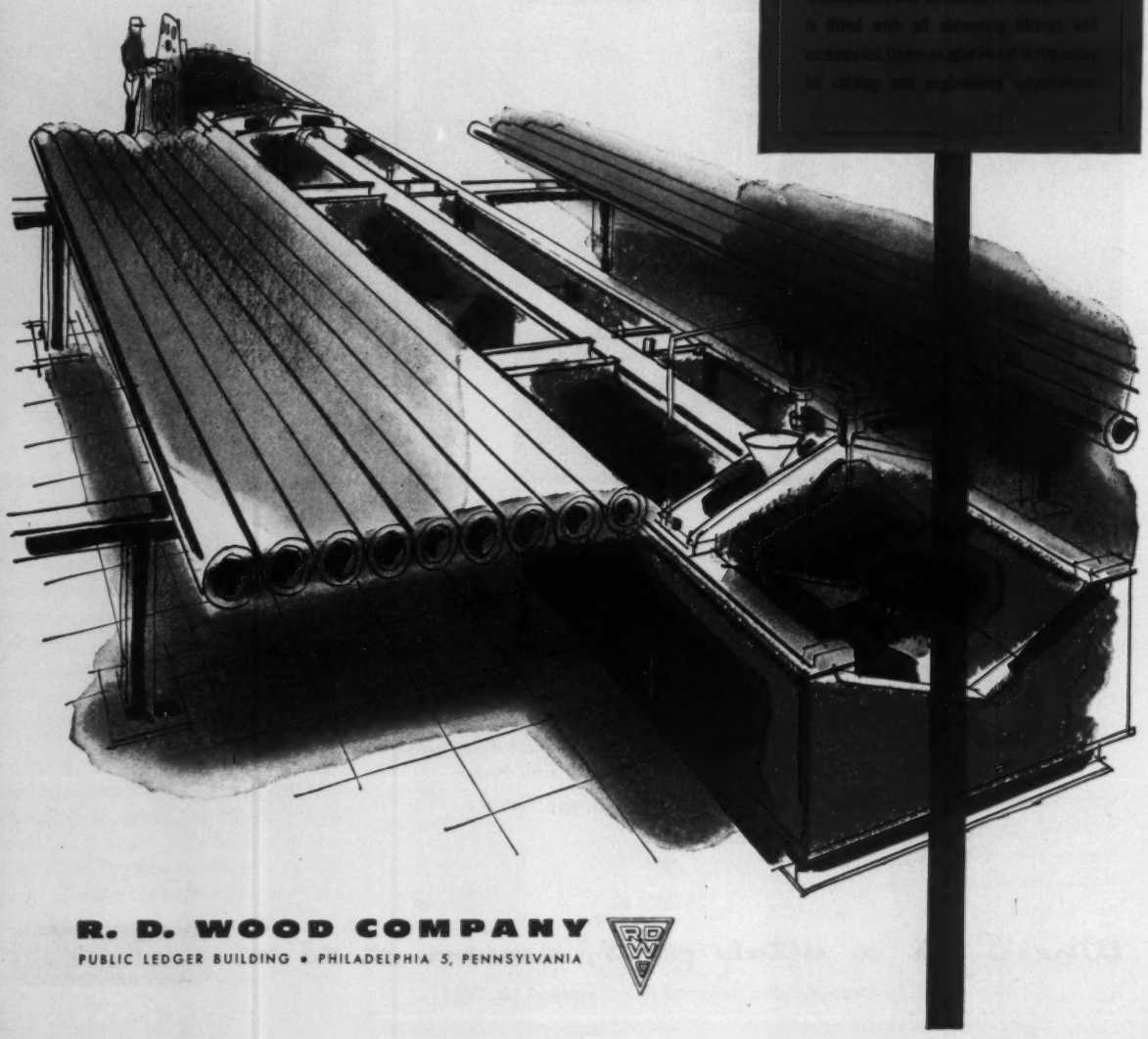


R. D. WOOD COMPANY

PUBLIC LEDGER BUILDING • PHILADELPHIA 5, PENNSYLVANIA

W. C. Keeley, elected chairman of the board, Vanadium Corp. of America.

Luria Brothers & Co., Inc.—**R. E. Schroeder,** promoted to vice president, Ohio district.

Fuller Co.—**C. C. Kaesemeyer,** appointed executive vice president, sales; **D. S. Douglass,** to vice president, division sales coordination; and **J. L. Prather,** to asst. to the president.

Hayes Steel Products, Ltd.—**R. C. McPherson,** elected executive vice president.

Union Carbide Olefins Co.—**P. L. Alspaugh,** appointed a vice president.

Warner Electric Brake & Clutch Co.—**J. H. deKruif,** appointed vice president, marketing and sales.

Gary Steel Supply Co.—**I. A. Ruder, Jr.,** named executive vice president and general manager; **J. L. Schuetz,** vice president, and **C. R. Hird,** sales manager; **R. E. J. Putnam,** named plant manager.

Metal Products Div., Koppers Co., Inc.—**G. J. Sanders,** appointed chief engineer, Sound Control Dept., Baltimore, Md.

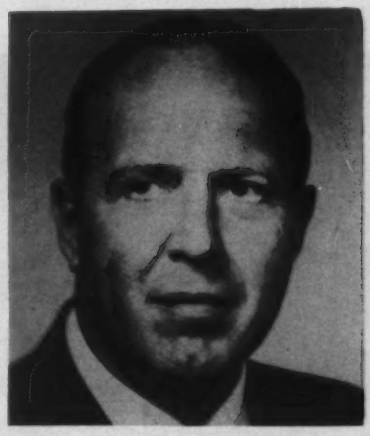
Alan Wood Steel Co.—**Joseph Toth,** appointed Philadelphia district sales manager, and **W. T. Haddon, Jr.,** as asst. general manager, steel sales.

Cleveland Worm & Gear and Farval Divisions, Eaton Manufacturing Co.—**W. B. Radke,** promoted to controller.

National Broach & Machine Co.—**R. L. Misener,** appointed asst. secretary.

Luria Bros. & Co.—**Albert Stern,** appointed district manager, Pittsburgh office.

Armco Steel Corp.—**G. H. Todd,** appointed asst. manager of the plant, Ashland, Ky., works; **G. H. Yost,** named general superintendent; **P. G. Sammet,** named asst. general superintendent, melting operations and **J. D. Patterson,** becomes asst. general superintendent, rolling and processing; **J. W. Flowers,** promoted to asst. general superintendent, plant services; **W. O. Richmond,** appointed superintendent, Openhearth Dept. and **A. M. Henderson,** promoted to superintendent, plant's East Processing Dept.



G. L. Weissenburger, elected president, Vanadium Corp. of America.

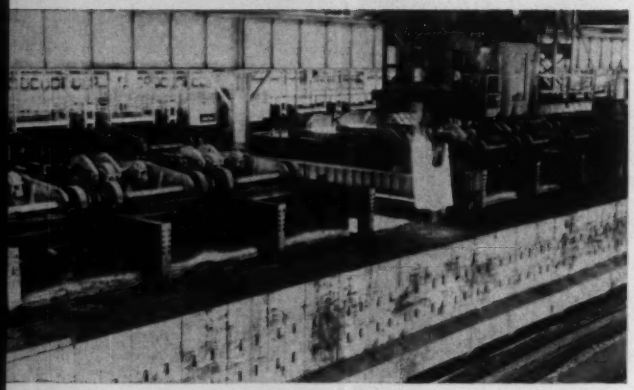
Norton Co.—**R. H. Gow** and **E. R. Stevens,** appointed supervisor, industrial engineering, crushing plants and as abrasive grain engineer, West Coast district, respec-

(Continued on P. 68)

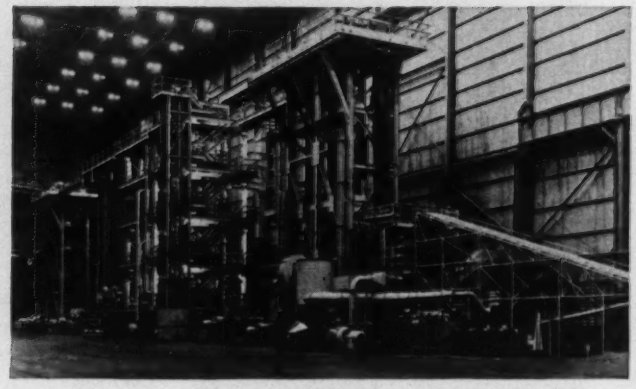
T. A. Fribley, elected president, The Cleveland Cap Screw Co., Cleveland.

G. C. Floyd, named senior vice president, Vanadium Corp. of America.

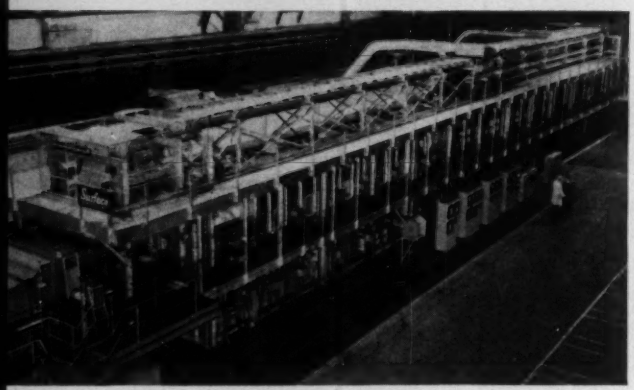
Maurice Gormly, appointed manager, Products Div., The Cincinnati Milling Machine Co.



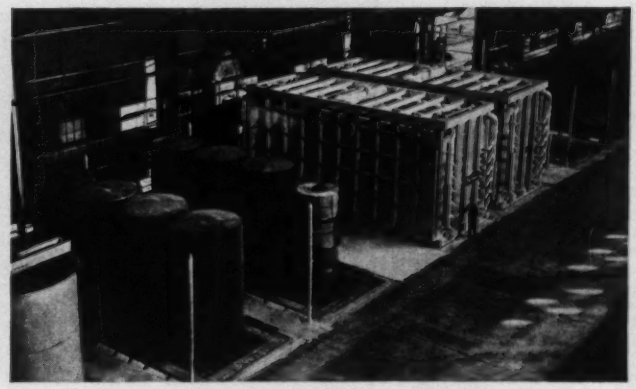
48 soaking pits installed at one time.



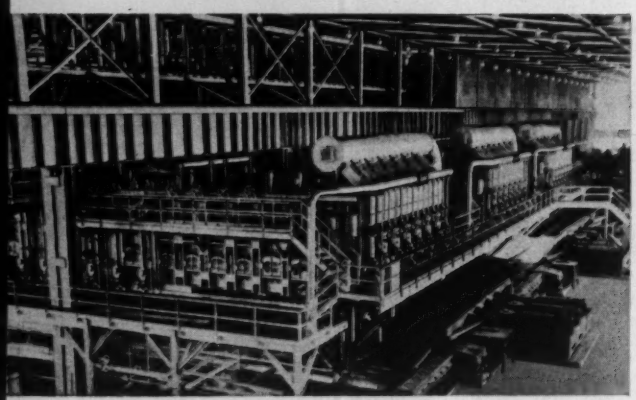
Continuous tin plate annealing line.



Normalizing line for enameling strip.



Multiple-stand annealing covers.



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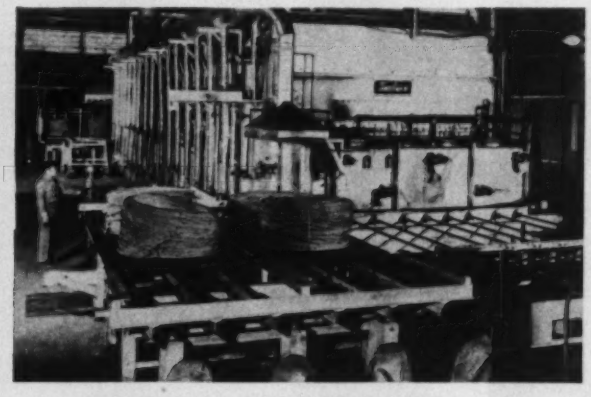
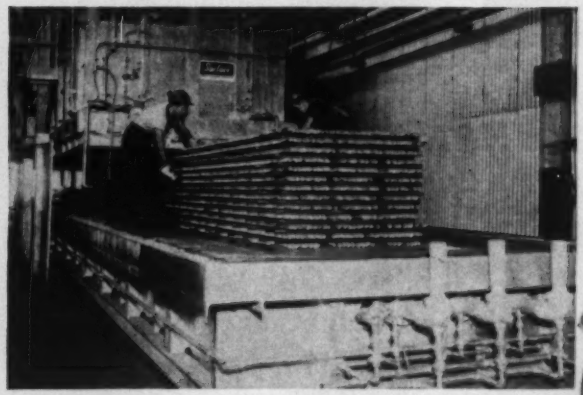


Annealing, carbon restoration furnace.



Car-bottom rod and bar furnace.

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(Continued from P. 65)

tively; **J. E. Haggett,** named supervisor, Industrial Engineering Dept.; **M. W. Greene,** appointed supervisor, Manufacturing Control Dept., crushing plants; **A. F. Howe,** becomes supervisor, Process Engineering Dept., crushing plants.

SKF Industries, Inc.—**P. S. Given,** appointed manager, airborne products.

New York Ore Div., Jones & Laughlin Steel Corp.—**C. N. Gilmore,** appointed mine industrial engineer.

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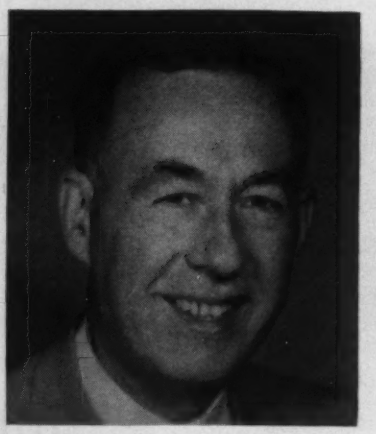
Pennsalt Chemicals Corp.—**Albert Rozensky,** named technical service engineer, Corrosion Engineering Products Dept. staff.



O. N. Dean, promoted to vice president, manufacturing, Exide Industrial Div., The Electric Storage Battery Co., Philadelphia.

Arthur Kellermann, appointed manager, manufacturing, Alemite and Instrument Div., Stewart-Warner Corp., Chicago.

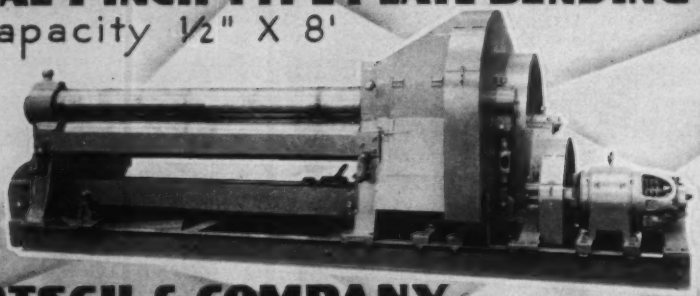
C. D. Brown, appointed manager, marketing, Instrument Dept., West Lynn, Mass., General Electric Co.

J. H. Richardson, appointed general superintendent, The Colorado Fuel & Iron Corp.'s Buffalo plant.

Russell, Burdsall & Ward Bolt & Nut Co.—**J. R. Metzger,** named sales supervisor, Rock Falls, Ill., plant; **H. A. Collins,** joins the

(Continued on P. 69)

INITIAL PINCH TYPE PLATE BENDING ROLL
Capacity ½" X 8'



Our Line
Light and heavy machinery for all classes of sheet metal, plate and structural work

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(Continued from P. 68)
Chicago sales office in accounting and sales capacities.

J. W. Pinks, appointed manager, Administrative Dept., Engineering and Construction Div., Koppers Co., Inc.

R. L. Schmid, Jr., appointed manager, industrial chemical sales, Aluminum Co. of America.

Reynolds Metal Co. — **G. F. Bradley,** named superintendent, operations, Listerhill Ala., reduction plant.

Loftus Engineering Corp.—**W. A. Morton,** elected chairman, executive committee in charge of foreign operations; **Walter Suydam,** elected president.

Republic Steel Corp. — **E. J. Keck,** appointed superintendent, steel conditioning, Canton, Ohio, steel plant; **A. W. Shaw,** appointed asst. superintendent, steel conditioning, Canton plant.

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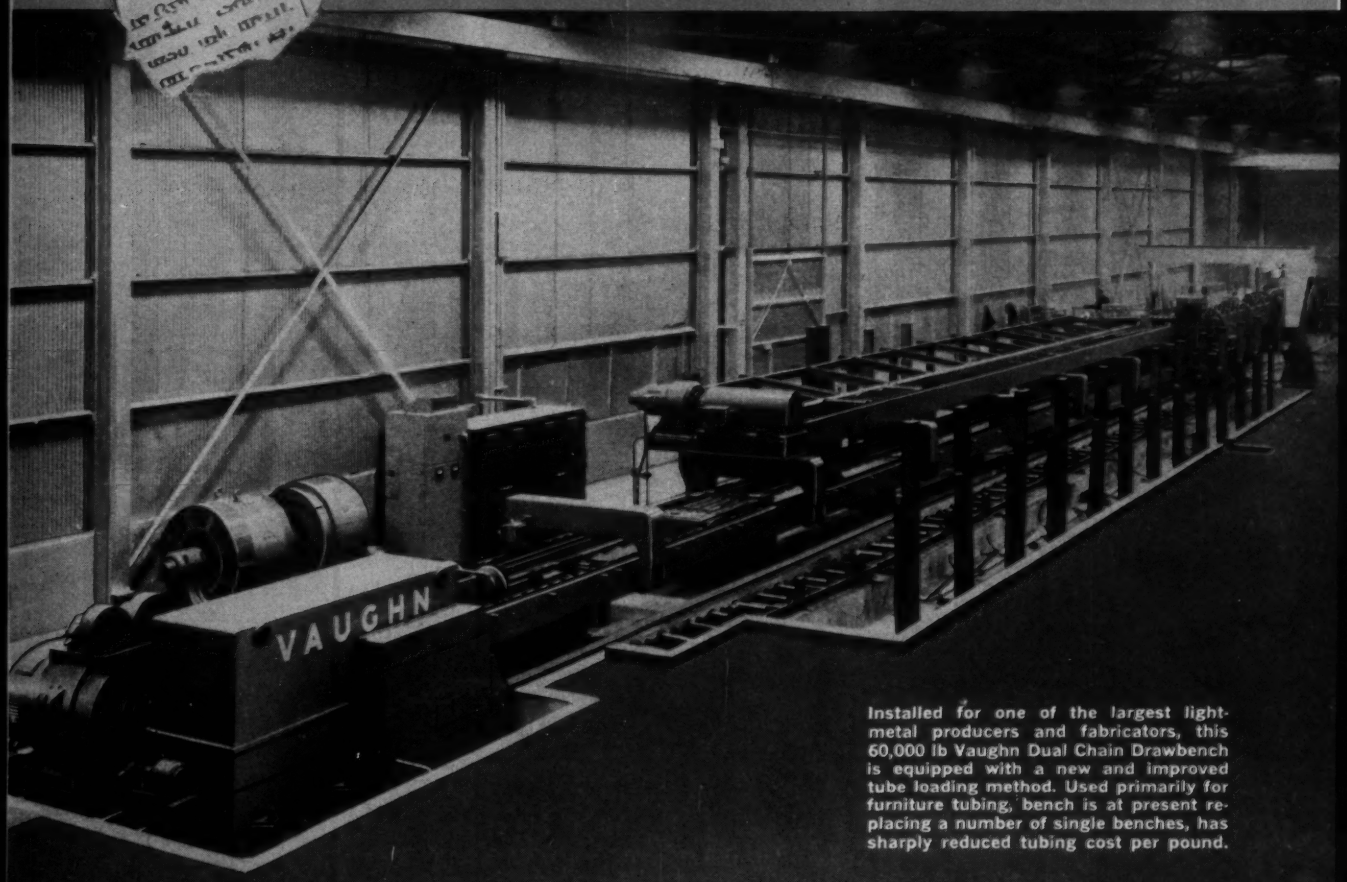
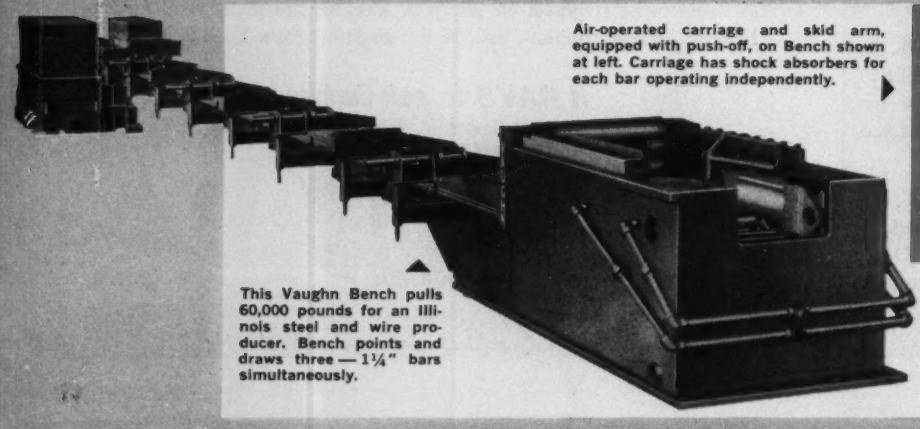
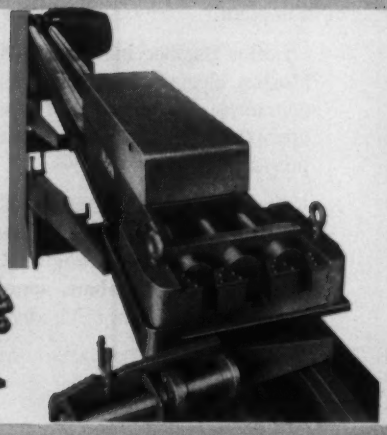


Installed for one of the largest light-metal producers and fabricators, this 60,000 lb Vaughn Dual Chain Drawbench is equipped with a new and improved tube loading method. Used primarily for furniture tubing, bench is at present replacing a number of single benches, has sharply reduced tubing cost per pound.



This Vaughn Bench pulls 60,000 pounds for an Illinois steel and wire producer. Bench points and draws three — 1¼" bars simultaneously.

Air-operated carriage and skid arm, equipped with push-off, on Bench shown at left. Carriage has shock absorbers for each bar operating independently.



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•Finer Cold Drawn Production!

Vaughn Machinery Company—builders of the world's most complete line of cold drawing equipment—is proud to present advanced new Drawbench models for tubes, bars, and shapes.

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Vaughn dual chain benches now in operation are drawing tubing up to 550 fpm—straighter tubing! In fact, generally higher speeds are now feasible with a new chain design which permits high speeds without lubrication problems.

New "floating" foundation design reduces installation and foundation maintenance costs. Many additional refinements contribute to Vaughn leadership in modern drawbench performance. Consult your Vaughn engineer on your cold drawing problems.

The Vaughn Machinery Company, Cuyahoga Falls, Ohio, U.S.A.

If it's Cold Drawn see **Vaughn**

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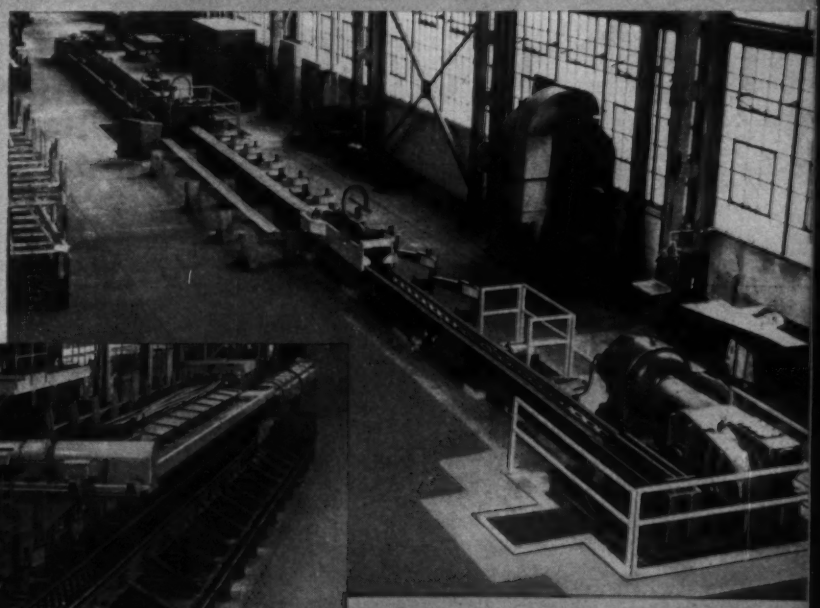
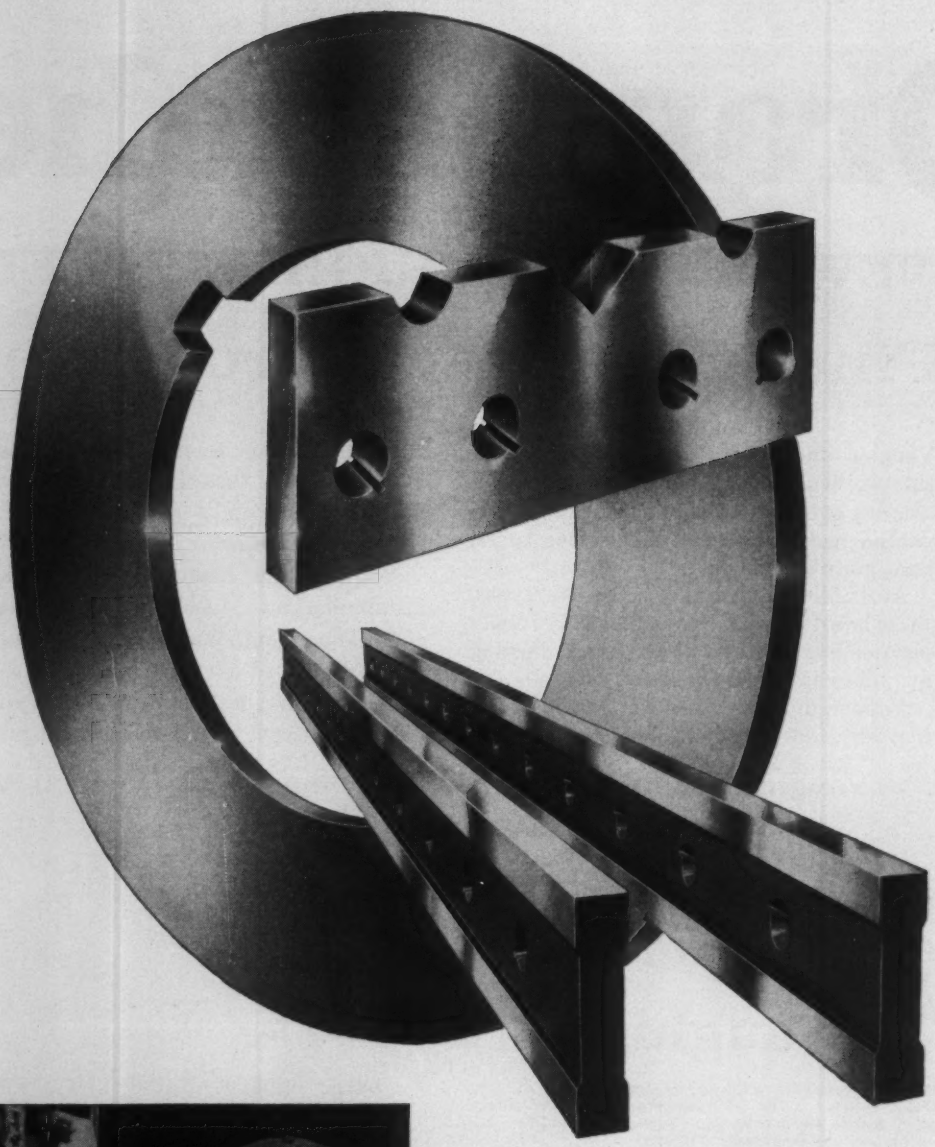
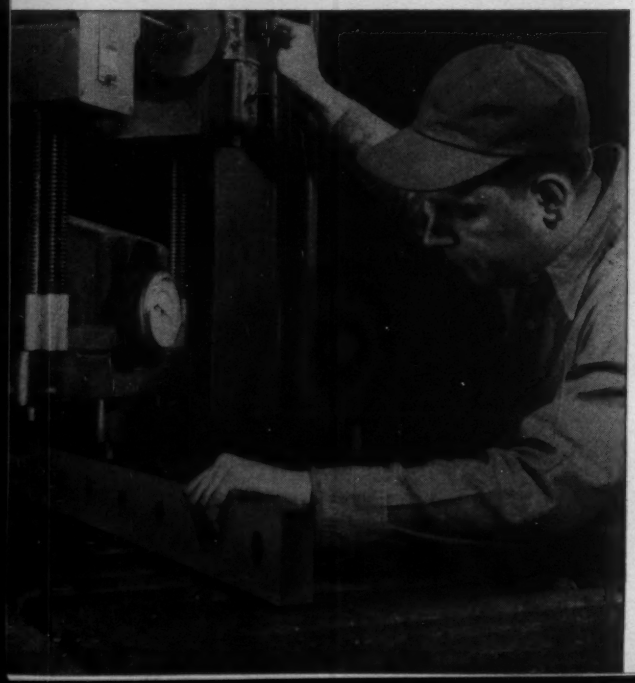


▲ For another Illinois producer, this Vaughn Drawbench is equipped for bars, tubes and shapes. It is used primarily for shaving magnesium on a production basis.

◀ Installed at a large Canadian tubing producer, this Vaughn Drawbench includes roll-over mandrel and, carriage tube shock unit and air clutch. Canada's largest-ever order for copper tubing was recently drawn by this bench.





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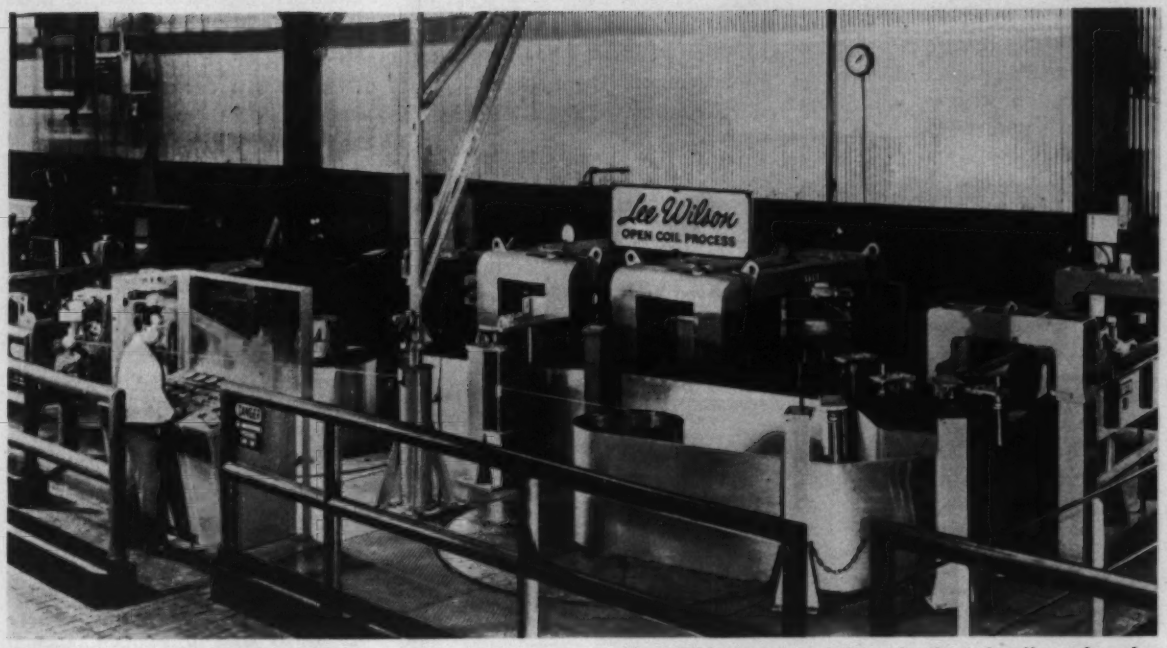


"OPENS" STEEL COILS: Note how nylon string is being wound between wraps of steel as it is being coiled. This process of "opening" steel coils makes the breakthrough in gas alloying commercially possible.

New Process Alloys Steel While in Coiled Form

Now in commercial use is a process for changing the chemistry of steel—not in the molten state but in the form of coiled strip.

Among its many applications are the production of ultra-low carbon and nitrogen steels—and at great savings.

■ Hailed as one of the most significant advances in steelmaking in more than a decade is a new open-coil process of gas alloying.

It is now economically possible to remove or add carbon, nitrogen and other alloying elements—that can be gasified—during the annealing of commercial-size coils of rolled steel. Present practice calls for controlling these elements during the melting cycle.

Though the first unit was put into operation at a major steel plant only last November, a total of 18 units, costing $27,000,000 are now in use or on order by steel companies throughout the world. So reports Lee Wilson, chairman of Lee Wilson Engineering Co., Inc., Cleveland, developer of the new process.

Performs in Many Ways—Applications for the open-coil gas alloying process are many and varied. They include: production of a low-carbon, enameling steel that needs only one coat of enamel; production of a steel that combines the good surface of a rimmed steel with the non-aging traits of a killed steel.

Key to the success of the new process of gas alloying is the same unique feature used in the open-coil annealing system, announced a little over a year ago.

This is the provision of an "air space" between the individual wraps of cold-rolled coils. Thus, an annealing gas which now also controls the chemistry of the steel can pass among these separations to reach and react with all the wraps of the coil—and for as long a time as desired.

Speeds Annealing Time — Another advantage of the air-space is that the coil can be heated rapidly and uniformly. Lee Wilson engineers report that the annealing cycle that would formerly take a week

for a coil can now be completed—along with gas alloying—in about 18 hours.

These air spaces are provided by winding nylon string between the wraps of steel strip as it is being coiled. After the entire coil has been wound, the nylon string is removed—leaving a loose coil.

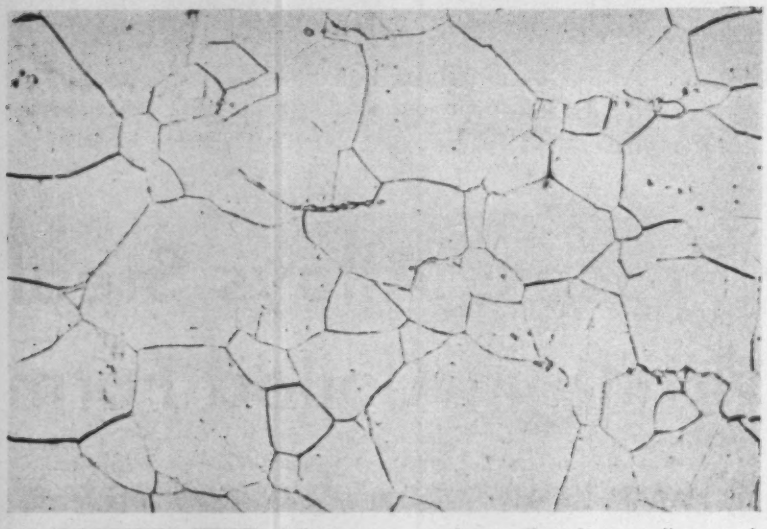
A specially designed magnet then transports the loosely-wound coil to the annealing and gas alloying furnace. After treatment, the steel is then rewound—using the proper tension and winding rate—into a tight coil for further processing.

Short Cycle Does Job—Here's a typical annealing cycle that steel producers can use to make a low-carbon, enameling steel.

First, the steel is heated in a dry, protective atmosphere of 8 pct hydrogen, 92 pct nitrogen (HNX) to 1300°F in about 4 hours. Moisture is introduced. Then, soaking of the steel goes on for about 6 hours.

The next step calls for purging of the moist gas with dry HNX gas for 1½ hours. Reason: to cool the steel without any chance for oxidation. Last, the annealing furnace is removed and the coil is placed under a cooling cover. It takes about 6 hours to cool the coil from 1300°F to 250°F.

This cycle will effectively reduce the carbon content of a conventional rimmed-steel from 0.06 pct to less than 0.005 pct.



NO CARBIDES HERE: Microstructure of gas-alloyed enameling steel reveals no carbides at grain boundaries and within grains. Mag.: 500X

How Gas-Alloyed Steel Compares

Typical Composition and Properties of Enameling Steels

	Rimmed Steel		
	Open-coil Gas alloyed	Box annealed*	Low-metalloid Enameling steel*
Carbon content, pct	0.002	0.06	0.03
Manganese content, pct	0.40	0.40	0.08
Hardness, R_b	38	42	38
Yield point, psi	28,000	27,000	29,000
Tensile strength, psi	42,000	45,000	45,000
Elongation, pct (2 in.)	44	42	40

* Drawing quality steel

Takes Only One Coat—To the enameler, this means that he need put only one coat of enamel on the steel.

In the past, enameled steels, such as used for refrigerators, washers and other appliances were given two coats of enamel. One was a blue ground coat; the other was a light-colored cover coat. Why? Enamel defects crop up when just the single cover coat is applied to standard enameling steel.

Advantages of the "direct-on" enameling steel are obvious. The steel producer doesn't have to supply low-metalloid steels that are expensive to melt and to roll. The enameler can cut out one of the enameling steps in his processing.

Lowers Carbon Later—There is another advantage of the process to consider. Many of the present grades of sheet steel must be melted to lower levels of carbon content than are consistent with optimum surface quality, cleanliness, and economic openhearth practices.

With the use of open-coil gas alloying, it will be possible to melt to the optimum carbon content for these factors, and then to lower the carbon content during annealing to the level desired in the final product. So reports the Lee Wilson Engineering Co.

"But," as Mr. Wilson points out, "this is only the beginning. Almost every day, our research lab or steel plant engineers where units are in operation come up with additional ways this equipment can increase production or develop better quality steels."

Improves Rimmed Steel — One area where the new process shows great promise is in the production of non-aging rimmed steel.

Auto manufacturers and others who fabricate parts by drawing like to use a rimmed steel rather than a killed steel because of the quality of its surface.

However, because rimmed steel ages, they must fabricate it within a specified length of time. Other-

wise, the ability to draw it deteriorates.

It's claimed, though, that if rimmed steel is given the open-coil, gas-alloying treatment under 100 pct hydrogen, the nitrogen gas present—the culprit that causes the aging—is lowered to a level where it gives little or no trouble.

Moreover, the non-aging rimmed steel should be a less costly substitute for the aluminum killed steel.

Can Put Carbon Back — Conversely, the process can also be used to increase the carbon and nitrogen contents of steels during annealing. Carbon, for example, can be restored to the surfaces of steel strip that has been surface decarburized during previous processing.

It has also been shown that the harder tin-plate tempers can be produced by adding nitrogen to plain-carbon, openhearth steel by open-coil gas alloying.

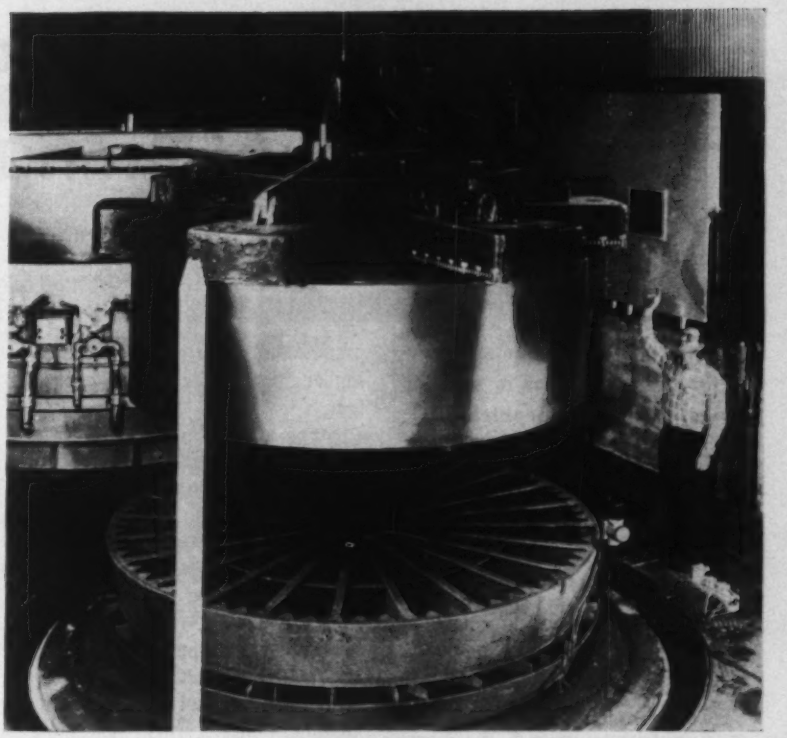
This means that tin cans will be lighter since they can now be made from thin-gage material.

Cost Is Factor—Until now, additions had to be made to the molten steel to increase hardness. These additions increase the cost of the steel and make the steel more difficult to roll to thin gages.

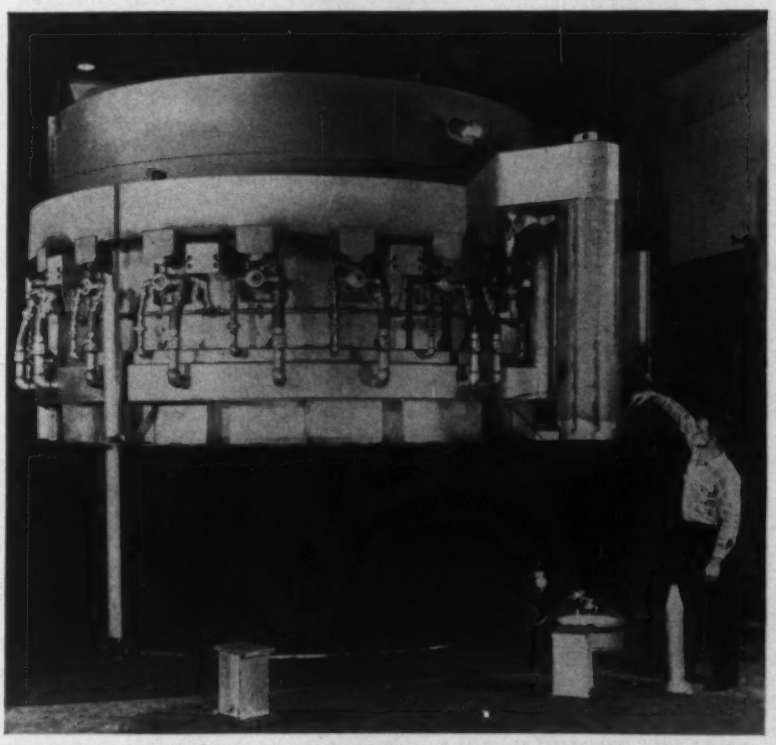
Thus, it should now be possible to make all the tin-plate tempers from one low-cost, easily-rolled steel. Adjusting to the desired temper can then be performed by controlling temperature, time, and atmosphere conditions during open-coil gas alloying.

What about processing costs? It's been estimated that savings, based on a number of factors including optimum openhearth time, reduced annealing time, and improved steel properties, will total $10-40 per ton —depending on the steel and the job it has to perform.

Reprints of this article are available as long as the supply lasts. Write Reader Service Dept., The IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



CARRIES TO FURNACE: Giant magnets were developed to transport huge, "opened" steel coils to the annealing and gas-alloying furnace.



CAREFUL CONTROL: Special, high-production furnaces closely control heat, gas content, and velocity when gas-alloying coils of steel.

Planned Attack Reduces Defects In Sand-Cast Aluminum Parts

By L. Iannettoni—Motor & Control Div., Westinghouse Electric Corp., Buffalo

Cooperation between supplier and user is essential in solving a complex casting problem.

After analysis, follow-up action prevents defect reoccurrence in future castings.

■ Scrap reduction results from close cooperation between casting suppliers and users. The prime factor in improving casting quality centers on an engineering approach.

This approach begins with the correct analysis of each defect. It progresses to definite action taken by both the supplier and the user. Use of experimental methods and follow-up action insures sound castings.

Review Defects—The foundry's contact man "signs off" defective material tags. He also aids the casting engineer in reviewing each defect.

Steps are taken to avoid a possible reoccurrence. All defects are catalogued. Then, the foundry proceeds in regard to corrective action for future work runs.

Machine operators in production lines must realize the results of efforts made—when they report casting problems. Their action plays a vital role. Interest of this type will reflect an over-all improvement in casting quality.

Positive Approach—Application of casting analysis to casting defects, coupled with liaison between supplier and user, provides a positive approach for corrective action. Result: Improved casting quality and fewer shop complaints.

A planned program of this nature leads to a better end product. It also cuts manufacturing costs.

Casting-analysis methods help to reduce defects in sand-cast aluminum blowers used in Westinghouse's Buffalo Motor Dept. Defects were a chronic problem for a number of years. These defects were classified as "shrink cracks" and "porosity" in the hub area.

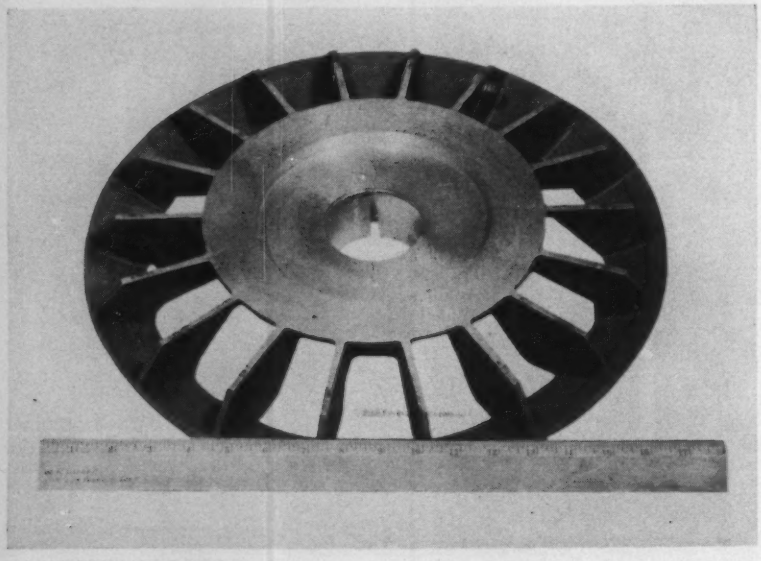
Trouble Sources — Analyses of scrapped castings indicate reasons for most of the trouble. They can be attributed to: poor design, the wrong alloy; and faulty foundry techniques. These factors cause shrinkage and coarse grain; porosity due to gas and pinholes; and inclusions due to dross and sand.

Both casting supplier and user must study the problem. No easy remedy is apparent.

A program was started at the Motor and Control Div. by the foundry contact man and the casting engineer at the Westinghouse plant. Their aim was to coordinate an investigation. This approach is possible only through good contacts and liaison.

Casting Analysis—A prime factor in checking the analysis of a casting defect is the proper diagnosis. In this case there were two main reasons for rejects. These reasons are cracking at the hub clamping portion and porosity problems.

Proper identification of all casting defects is a must. It reveals the basic causes for each defect. These include shrinkage, coarse grain, porosity and inclusions. Identification of defects creates the course of action taken for their remedy. Re-



ANALYZE TROUBLE: Shrink cracks at hub and mottled effect at the outer hub area illustrate two major defects in sand-cast aluminum blower.

lated considerations affect design of the casting; changes in casting alloy; and checks on foundry methods.

Many designs were reviewed on most of the aluminum blowers. The more troublesome ones were segregated. A comparison was made between these designs. Castings were cut up and the nature of each failure was noted.

Observations indicate that the clamping stress in the hub portion of the blower is critical. A change in design improved this cracking condition.

Coarse Grain—But there was still a need for more improvement. Coarse grain and porosity still existed in the hub area and in the remaining portions of the blower.

In a review of casting specifications, it was noted that several aluminum alloys were being used. Several of these alloys were causing quite a bit of trouble.

Discussion of this phase of the problem with the foundry and design engineers, resulted in a recommendation that one alloy be used—which would be suitable for most of the present aluminum blowers.

Test castings were poured. The results indicate that Westinghouse PDS 9312-2 is the most suitable alloy. This alloy is the commercial 356 T6 aluminum casting alloy.

Castability is important. Although there are alloys with better mechanical properties, these properties aren't always obtained in the cast product.

Single Alloy System—Advantages of a single alloy system benefit both the casting supplier and user. The foundry benefits by eliminating the handling of several alloys. Standardization of foundry methods is thus made possible. And a reduction in casting variables also results.

With the elimination of cracking by design change and the improvement of mechanical properties due to alloy change, one defect remained. This defect (porosity) was corrected by the revision of foundry gating and melting methods.

Compare Casting Problems

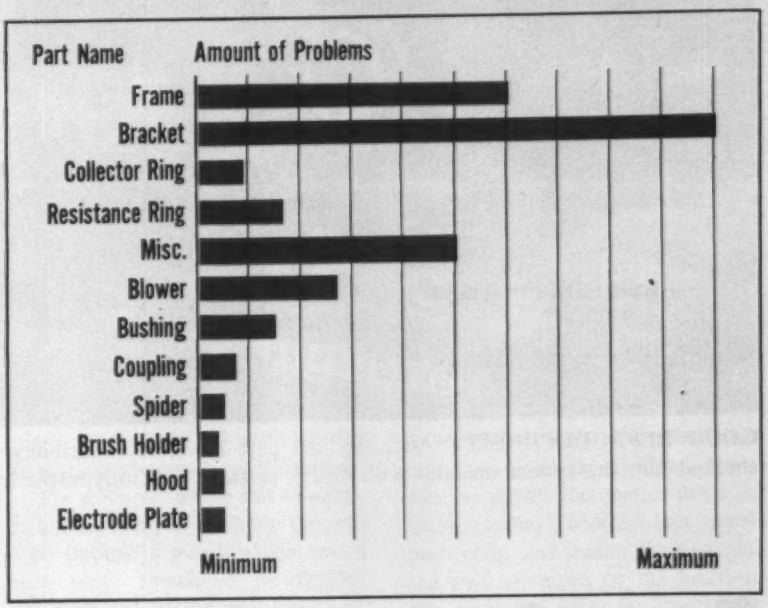
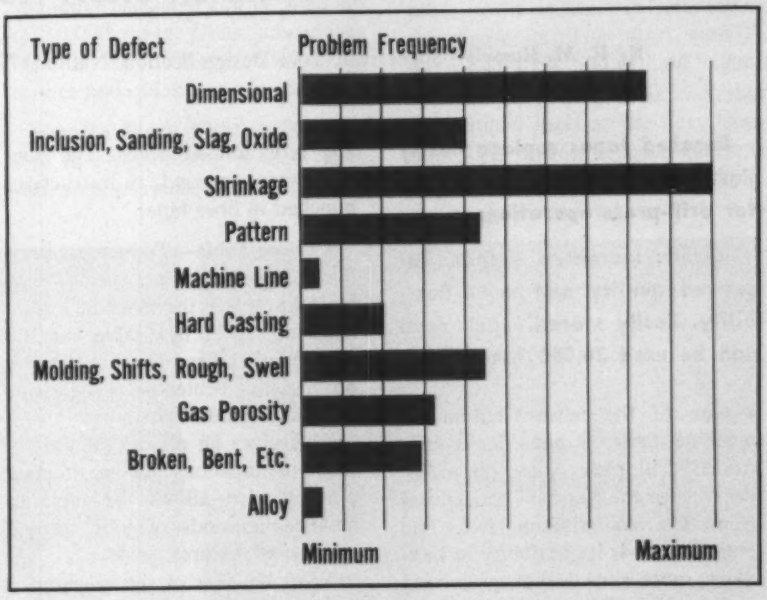


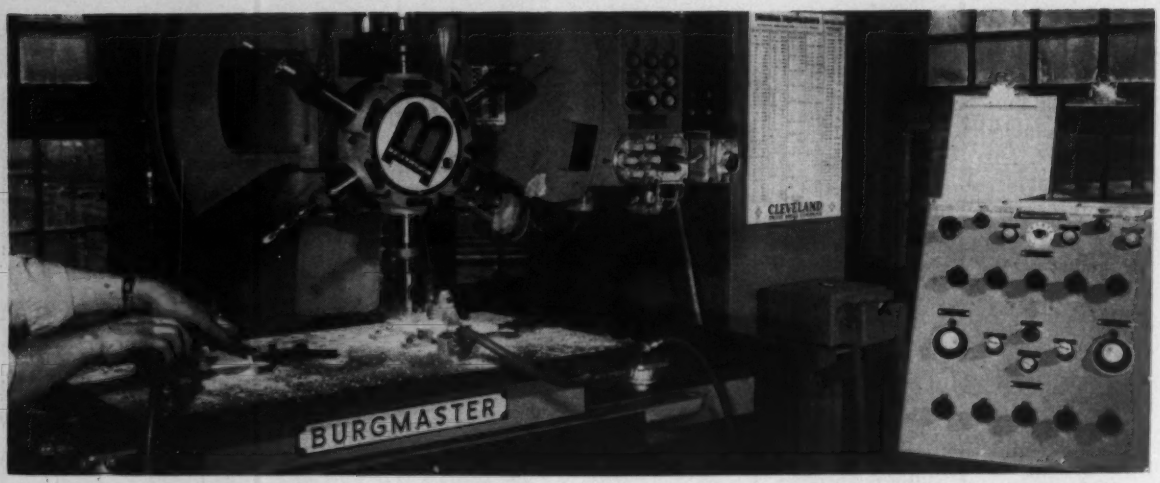
Chart Frequency of Occurrence



Design of the aluminum blowers could be further altered to improve the coarse grain and porosity conditions. But, it was agreed that the porosity defects are attributed to lack of control in foundry practice. Therefore, the foundry agreed to check out their methods.

Samples were made and analyses of various casting methods were coded to machining results in the manufacturing lines. Outcome of this cooperative analysis pays dividends.

To date the number of casting defects has been reduced about 95 pct. and complaints from machine lines have become almost nil.



GOOD REPRODUCIBILITY After the first part is checked out, the system operates with nearly perfect reproducibility. This means less scrap and rejects. Costly inspection and quality control aren't needed.

Tape System Automates Drilling

Numerical Controls Cut Costs on Short-Run Plastic Parts

By **R. M. Russell**—Supervisor, Tool Design Section, National Vulcanized Fibre Co., Wilmington, Del.

Punched tapes replace costly jigs and fixtures in tooling up for drill-press operations.

Result: increased output, improved quality and more flexibility. Easily stored, each tape can be used 30,000 times.

▪ One of the newest automated machine tools, a numerically-controlled drill press, piles up major benefits for the National Vulcanized Fibre Co., Wilmington, Del. The main benefit is its flexibility in handling short runs. A programming system devised by National's engineers aids in this respect.

The new machine tool is a Burgmaster Model 2BHT turret drill made by the Burg Tool Mfg. Co., Inc., Gardena, Calif. It has a GE numerical tape-control system. This system positions the work table and operates the turret to suit individually programmed needs. The control system responds to instructions punched in fiber tape.

Custom Table—To increase flexibility, National built a special work table to replace the machine's standard table. The new table has 322 positioning holes. These holes are on 1½-in. centers — progressing from a common zero point.

This gives an almost infinite variety of locations for positioning pins. It also allows the table to handle thousands of jobs without the use of fixtures.

Working area of the machine is 15 by 26 in. Since the table is larger, the entire working area can be used. Air clamps can be positioned outside the working area if needed.

Double Program—It's also possible to double program the machine for two pieces of work, whenever both can be fitted in the work area. This permits an operator to load one work station while another is in automatic operation. The same tape services both work stations.

National is a major supplier of basic materials such as vulcanized fiber, laminated plastics, nylon and Delrin—in sheets, rods, tubes and other forms. However, a large part of the company's business centers on supplying precision fabricated parts.

Major markets are electrical, electronic and military parts where high quality is a must. End products include: switch gears, circuit breakers, terminal boards and aircraft components. Many of these parts serve mechanical as well as electrical functions.

Short Runs—Quantities are often limited. This is because of the special nature of the equipment the parts are designed for. A short run can mean from 1 to 300 parts.

That's why numerical control for drilling is important. Tooling up for short runs on conventional equipment requires the design and building of a fixture and jig. This inflates cost estimates. It also delays production.

Another prime factor is consistent product quality. Numerical control provides nearly exact reproducibility, time after time—without a chance of human error. If the first piece is right, all thereafter are right.

This means less scrap and rejects. It also means better assembly results. And it eliminates costly inspection and quality control.

Optimum Service — Taking the human element out of machining plastics results in a significant savings. The machine operator is not responsible for selecting the proper table feeds and spindle speeds. These are selected by a process engineer. Thus, optimum rates are pre-selected for each run. As a result, tool life is extended.

A typical job is an aircraft computer part. It consists of a silicone-glass laminate bulkhead with 36 holes drilled from each side. Formerly this part needed a drill jig which cost $160. It took a week to design and build the jig. Ten different drills were used. And it was not uncommon to find a hole missing in a completed part.

Inaccurate positioning of the drill jig sometimes allowed small drills to veer off center. This ruined the work.

The operation is now done on the Burgmaster turret drill by numerical control. No drill jigs are needed and rejects have tumbled.

Flexible Design—Since quite a bit of National's business is custom fabrication, design changes are continual problems. Elimination of the delays and the heavy expense of fixtures allows these changes to be made at less cost. All that's needed is a slight change in programming.

For example, a hole can be eliminated by simply running the old tape through a punch which cuts a new tape. Unwanted instructions are bypassed on the new tape.

The fiber tape National uses is one of its own products. It's a special grade of vulcanized fiber with a high tensile and a high bending strength. This tape can be used up to 30,000 times. Other advantages include: easy storage, non-tearing service and quick reproducibility.

Smooth Work Flow — The first step in programming a part starts with an approved engineering drawing returned by the customer. On this drawing, the drill holes are marked for reference.

A process engineer fills out a tool- and positioning-diagram sheet. He notes the correct drill sizes, speeds and feeds and locates the work-positioning holes.

Next, a draftsman completes a programming data sheet. Using a fixed reference, or zero point, he computes table and turret motions. He lists them in the sequence they follow. This data is transferred to tape. A tape-punching typewriter reproduces the data sheet for checking purposes.

Ready to Run—Program sheet and tape go to the machine operator. He selects the correct drills for each spindle. Then, he sets speeds and feeds, and inserts the positioning pins as shown on the positioning diagram. After he inserts the tape in a tape reader, the machine is ready to operate.

At the push of a button, the tape starts through the reader. The work table positions itself in relation to the zero point. The turret spins to the proper drill, and drilling begins.

When one hole is done, the table re-positions itself at the next location. This process repeats itself until all operations are completed.

FIRST STEP: A customer-approved drawing aids the process engineer in planning initial programming.

TAPE READER: Tape, inserted in system's automatic readout unit, is spliced in an endless loop.

Blind Rivets Induce New Joint Designs For Metal Fabricators

Sheet metal fabricating is made quick and easy with the use of blind rivets.

Metalworkers realize the time and effort saved by their use. Here are just a few simple points to keep in mind.

■ Three basic methods account for most of the fastening done in the metalworking industry — threaded fasteners, spot welding and riveting (blind riveting to be exact). For reasons of handling and joint design, as well as cost, blind riveting has proven to be suited for sign manufacturing.

The blind rivets can be inserted and set from one side of the work. There is no need for access to both sides. In this industry, limited back clearances are common.

For standard joint applications where access to both sides is available, the rivets offer fastening ease greater than that found with screws. A blind rivet consists of a hollow, heavy-walled shank pierced by a mandrel.

Special Name—Tension, applied to the mandrel, pulls the head of the mandrel through the rivet shank to spread and set it from the front. At a predetermined point, the mandrel breaks and is discarded. It is called the "Pop" rivet and is made by United Shoe Machinery Corp., Shelton, Conn.

In making a sign, manufacturers recognize that a substantial amount of labor goes into fastening. One large company in the Boston area estimates it represents 15 pct of it's total labor costs.

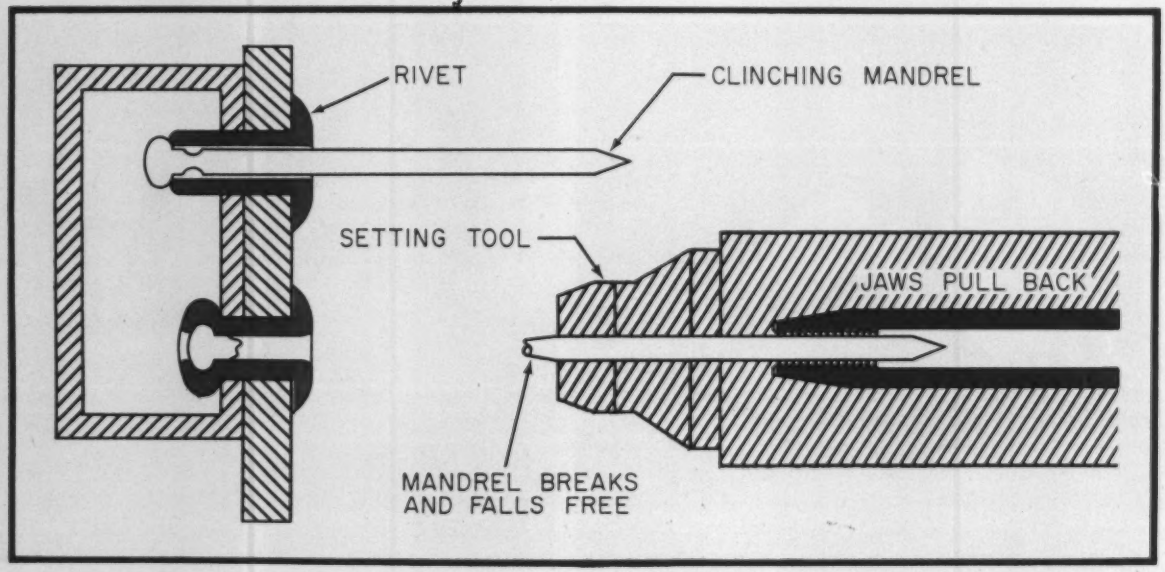
Most sign manufacturers have adopted the rivet for many reasons. It's a blind fastener and therefore has wide application in their operations. Setting tools are portable. The fastening operation is taken to the work, thus eliminating serious handling problems.

Easily Used — The speed with which the rivet is set equals or surpasses that of installing a sheet metal screw. The rivet can be used to join thin sheets without requiring a back-up strip.

Employees can make a quality joint easily and without concern about torque limits. Usage does not conform to any one pattern. Almost any joint affiliated with a sign can be fastened with the rivet.

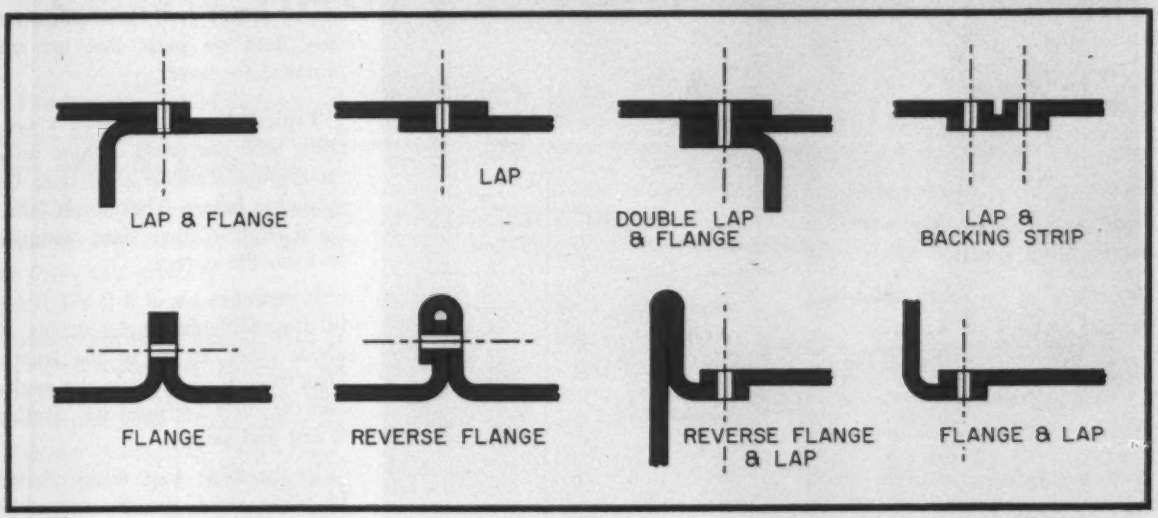
Use Proper Tools—The type of setting tools varies with the plant.

The Basic Principle Of The Riveting Tool



HOW THEY WORK—Rivets are inserted and set from the same side of the work. The retracting jaws in the setting tool pull the mandrel head into the rivet on the reverse side until it breaks under tension.

Typical Joint Designs Used with Hidden Rivets



PROPER CHOICE — Wind-loads and mounting stresses may require the fabricator to use heavy gage panels. Joint design, besides giving the desired appearance, must be sturdy.

Some prefer hand pliers which may be carried around by a fabricator. Others select the pneumatic or hydraulic guns because of their automatic setting features.

The guns also offer better cycling time and the range of rivet diameters that can be set without changing the setup.

Generally, manufacturers use a rivet of one diameter but with a grip length selected to suit the total thickness of the joints. Rivet material normally is aluminum or stainless steel, depending on the material used for the sign.

Joint Designs—Three basic joint designs are used by Donnelly Sign Div., Donnelly Electric and Mfg. Co., Boston. One is a lap joint in which mating steel strips simply overlap. Backed with a reinforcing angle, the strips are riveted together.

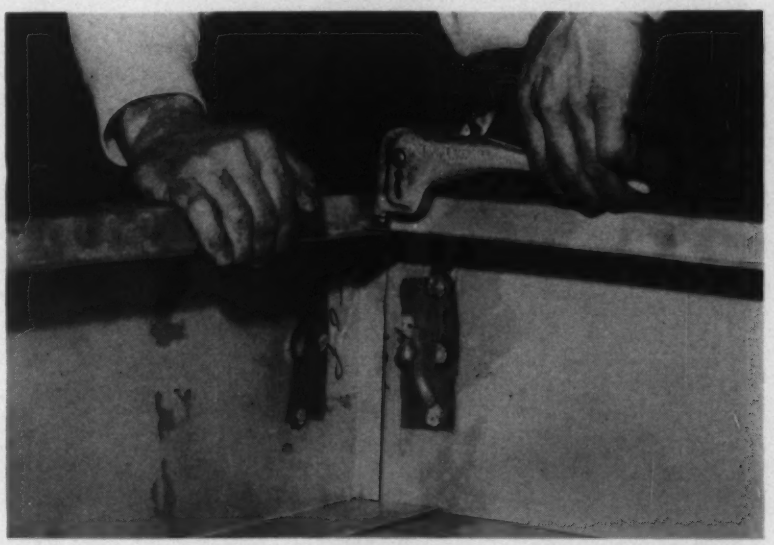
A second joint design used is similar except for a flanged edge that carries one sheet. The third is usually employed for the edge construction of letters. It requires a reverse bend and a flange to carry the face of the letter.

Interlaced between the panels are stiffening angles, held in place by rivets. Many other useful joint designs are, lap and flange, single or double lap and back strip, straight flange, and reverse flange and lap.

Case History—When University Sign Co., Cambridge, Mass., decided to adopt the Pop rivet, management purchased two automatic rivet-setting guns. Connected to existing air lines, these tools serve as the principal element for an efficient in-line fastening procedure.

Small signs are manually moved to each department. They may be spot welded when both sides of joints are accessible and riveted when one side is blind.

Large signs are moved on a



SOLID CORNER—Flanges at the corners are quickly fastened with a Pop rivet and a hand tool. Thickness of flange material and poor accessibility made this a tough job for screws.

SIMPLE METHOD—The requirement for a blind fastener is obvious when a large component must be assembled with little or no access to internal joints. A simple hand tool sets the rivets.

HIDDEN RIVETS—Internal reinforcing angles are attached to the skin of a sign. The use of a pneumatic rivet tool sets the Pop type rivets. This special tool works directly from an air supply of 75 psi.

wheeled table or placed on a stationary table and riveted with a nearby setting gun. Hand pliers are only used on parts that are not practical to move.

Typical Usage — Everyday fastening with the rivets is done on a rectangular stainless steel base for mounting letters. The unit is fabricated from 22-gage sheet wrapped to form the corners.

It measures about 8 ft x 1 ft x 8 in. deep. Stiffening angles are placed about every 30 in. of the length. Once predrilled holes in the angles and the sheet are lined up, riveting is fast and simple.

In the same way, a skirt is set in place along the top edges by using one Pop rivet in each mitered corner. Use of Pop rivets and both automatic setting tools and hand pliers have amounted to over a 50 pct saving in fastening time for this company.

Proper Tool Helps — Batten Brothers of Wakefield, Mass., another principal sign manufacturer in the New England area, also relies on both automatic and hand setting tools. It substitutes Pop rivets for screws wherever possible, preferring them on thin sheet applications because of the setting time advantages.

Normally, sheets are flanged and then butted or overlapped. Dimensional limitations in the flange created by design sometimes limit the method of clinching to the hand pliers.

But for most applications the faster cycling time of the automatic tools is an advantage that is difficult to ignore. The company is also experimenting with the idea of riveting neon tube supports to facings.

One component, an angle mounting bracket, is slotted and at present is attached with sheet metal screws. There is reason to expect that, with a minor change, this can be riveted in place and both setting time and joint quality can be improved.

Lab Checks Contractors' Gages

The Department of Defense requires all contractors to check their measuring instruments.

To meet the demands a standardizing lab is now set up to perform the process.

■ Under the revised regulations of the Department of Defense, all prime contractors and their subcontractors must prove out their precision measuring instruments. The National Bureau of Standards is the only source of all true standard measurements in this country. The contractors instruments must be compared to and referenced to the primary standards.

This process is called traceability of standards. It has been compared to tracing the continuity of an electrical circuit from an outlet to its source.

Whether the measurement be of mass, distance, time, electrical energy or any other, the primary standard against which all comparisons are made is in the bureau.

This means that all instruments used for precision measurement in the field of optics, physical dimensions, electronics, microwaves, and infra-red must be compared at specific times with reference standards. These in turn are regularly compared with those at the bureau.

Go Between—To help meet the large industrial demand for gage checks, Metrolonics Inc., Burbank, Calif. has established a laboratory to provide the necessary link between NBS and the many manufacturers who use precision measuring instruments.

To assure high quality measurement standards, Metrolonics has constructed a laboratory that maintains a constant temperature of 68° F. It also keeps a constant 40 pct humidity 24 hours a day.

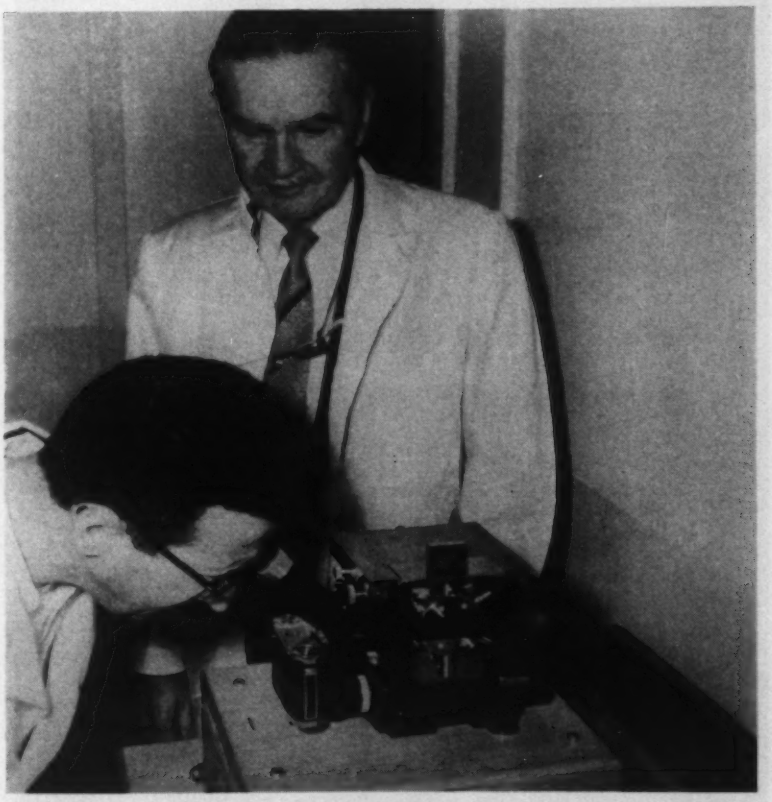
This laboratory contains a Zeiss Interference Comparator. The instrument measures the lengths of gage blocks to one-tenth of one-millionth of an inch by comparing interference bands of different wave lengths of krypton and helium.

Checks Two Planes — Another instrument used is the Zeiss Universal Measuring Machine. The unit measures size, roundness and shape in two axes of measurement to fifty-millionths of an inch. It also measures around two planes of rotation to one minute of arc without the part being removed from the instrument.

Further expansion is scheduled by Metrolonics. The next development phases in their order will be to establish laboratories for hydraulics, electronics, microwave, optics, and infra-red standards.

Sound Basis — Careful selection and training of personnel is the primary factor in the rate of establishing these laboratories. Technical employees, regardless of background, education or experience, must attend classes for three months in the science and philosophy of measurement and calibration.

The services Metrolonics, Inc. will supply to industry have been generated by the new demands for "Space Age" precision. Studies conducted by the Aero Space Industries Association and The Department of Defense have clearly defined the areas of traceable calibration for which the primary contractors in missilry are responsible.



RECORDS DATUM—This Zeiss Interference Microscope reads green wave bands of Krypton light to one-tenth of a millionth accuracies. It is equipped with a 35-mm camera for recording purposes.

Steel Jacket Protects Beryllium During Extrusion Process

By R. C. Harris—Section Chief, The Beryllium Corp., Reading, Pa.

Beryllium tends to seize or gall when it's extruded.

Seamless steel jackets prevent both seizing and galling. They also preclude oxidation and serve as lubricants.

■ A new extrusion method is being used to fabricate beryllium. It serves in commercial production of rounds, squares and rectangles at The Beryllium Corp.

Experimental work, now being done, promises to extend the new process to tubing and other more complex shapes.

Double Bonus—Two distinct advantages result when beryllium is extruded. Strength levels are raised above other forms of the metal. And greater economy also results.

Greater economy is due to higher yield of starting billet to finished stock. Savings are high when compared to the more common method of hot-vacuum pressing and machining to the desired shape.

Successful extrusion of complex shapes will require process refinement. Why? Because it's necessary to extrude beryllium encased in a steel jacket.

Bare extrusion of beryllium shapes has — for the most part — been unsuccessful. The bare extrusions present many problems. These center on: surface-finish flaws; poor dimensional tolerances; and loss of strength.

Requires Jacket — Jacketing an extrusion in steel serves three main purposes. The jacket acts as a lubricant since beryllium metal readily seizes and galls tools. It also keeps the beryllium in compression during the extrusion process.

In addition, the seamless-steel jacket cuts down oxidation during heating and extruding operations.

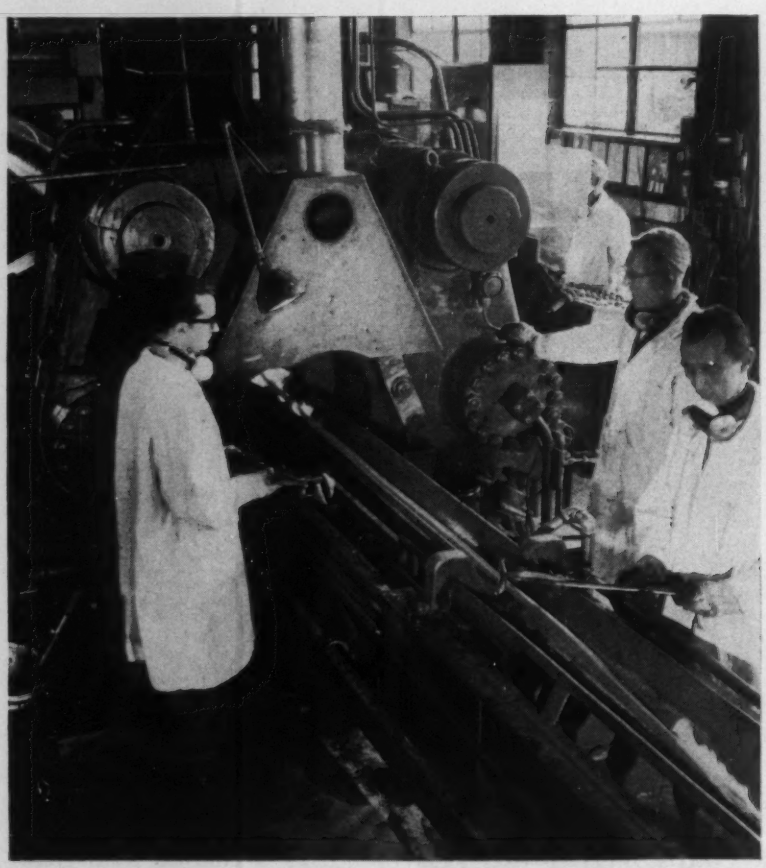
Although cast beryllium has been extruded with moderate success, commercial extrusions are now formed from hot-pressed beryllium powder. There's a sound reason why this is the case. Powder produces finer grain sizes and better mechanical properties.

Each steel jacket is made from a seamless steel tube. One end of the tube is closed. This forms a 45° angle.

No Oxidation — Billet heating takes place in a conventional resistance furnace. The jacketed billet is placed inside a graphite sleeve. It's completely covered. This prevents oxidation.

During conditioning, the temperature ranges from 1750° to 1950°F. Heating time and heating control are vital.

Just prior to extrusion the jacketed billet is removed from the graphite container. Transfer time from the furnace to the extrusion liner is kept to a minimum. This allows control of the actual extru-



READY FOR EMERGENCY: Clad beryllium emerges from a 1700-ton hydropress. Operators use respirators in the event of a steel-jacket rupture.

sion temperature within narrow limits.

As a rule, some straightening is needed for all extrusions. Standard straightening methods are used.

Rod sizes range from ½- to 2¼-in. diam. Size and shape of each extrusion determine the straightening method which will be used. All straightening is done hot—while the steel clading remains on the beryllium metal.

Good Finish—The surface of the as-extruded metal has a thin oxide coating. This coating forms at the "preheat" temperatures. Surface finish is better than 63 rms.

Standard practice calls for a light machine cut. This gives a better finish and allows the final extrusions to meet various size requirements.

Properties of each extrusion are checked in accordance with established quality control methods. Tensile bars are cut from various locations within the extrusion. This insures a high degree of uniformity throughout.

Room temperature tensile properties of extruded beryllium depend to a great extent on the extrusion ratio used. Uniformity of these properties is also somewhat dependent on the reduction ratio.

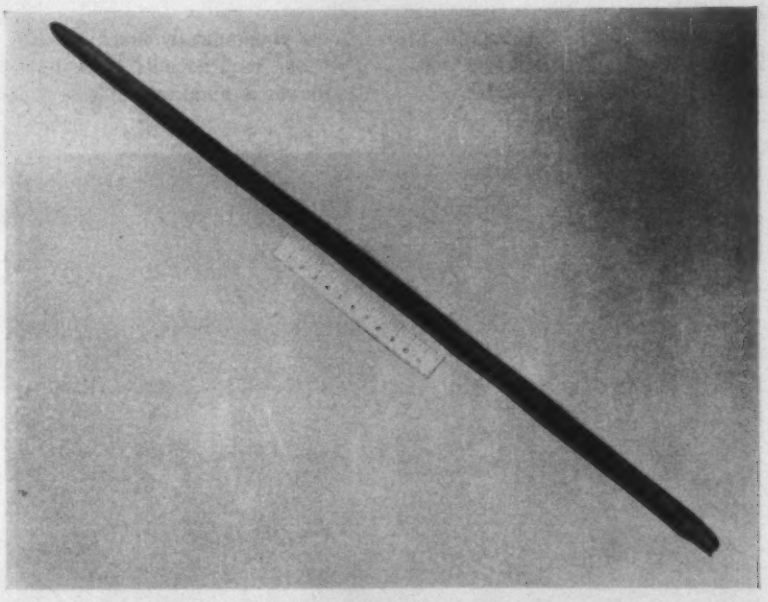
High Reduction Ratios—To obtain good properties and a uniform product, metallurgists at The Beryllium Corp. specify minimum reduction ratios of eight to one.

At present, the largest diameter available is 2¼ in. But, larger sizes up to 3½-in. diam are expected in the near future. The larger sizes hinge on a development program that is nearing completion.

An interesting use for the extruded rods centers on the production of beryllium fasteners. The Standard Pressed Steel Co., Jenkintown, Pa., reports moderate success in making beryllium bolts with rolled threads.

The Beryllium Corp. supplied material for this important research program. Tests at SPS show good mechanical properties. They include: tensile strength, 97,600 psi; yield, 46,500 psi; elongation, 11 pct.

STEEL JACKET: Hot-pressed beryllium billets are inserted in a steel jacket prior to extrusion. This is the key to a new extrusion process.



LONG AND LEAN: Finished extrusion has good surface finish and good mechanical properties. Last step calls for removal of steel jacket.

Compare General Properties

EXTRUSION DIAM, in.	TENSILE STRENGTH, psi	YIELD STRENGTH, psi	ELONGATION, pct
½ – 1	94,000 –100,000	44,000 – 50,000	10 – 15
1 – 1½	90,000 – 96,000	44,000 – 50,000	8 – 13
1½ – 2¼	84,000 – 90,000	44,000 – 50,000	4 – 9

Steel Inserts Add Strength To Laminate Tooling

By using steel inserts at the point of high stress, laminates take on new uses.

The tougher mold and jig-fixture applications are open to low-cost construction.

■ Don't dismiss plastic or fiber materials from consideration for the tougher mold, jig and fixture applications. They have the basic strength required for the job.

In many cases, particularly in forming operations, laminated plastics and vulcanized fiber are used by placing steel inserts at the point of stress. A variety of jigs and fixtures made of laminated plastic are used for machining operations by applying the same principle.

The composite laminated materials pay off in terms of lower material costs, lighter overall weight and better machinability. The material is used over and over again to produce satisfactory tooling.

Laminated plastic components of such tools, unlike hardened steel, can be economically machined for new tool requirements. The tools can be used hundreds of times as long as the piece remains large enough to machine.

There are no burrs on laminated plastic tooling to scratch the work. Final finishing is not required.

Reduce Spending—An excellent example of payoffs which can be realized by using laminate tools with steel inserts is forming molds. Such molds are designed to postform and punch holes in a part of complex shape made from laminated plastic sheet stock.

The mold affords more-than-adequate strength without reinforcement for job of forming heated materials. By combining the molding and punching operations a number of steps are reduced.

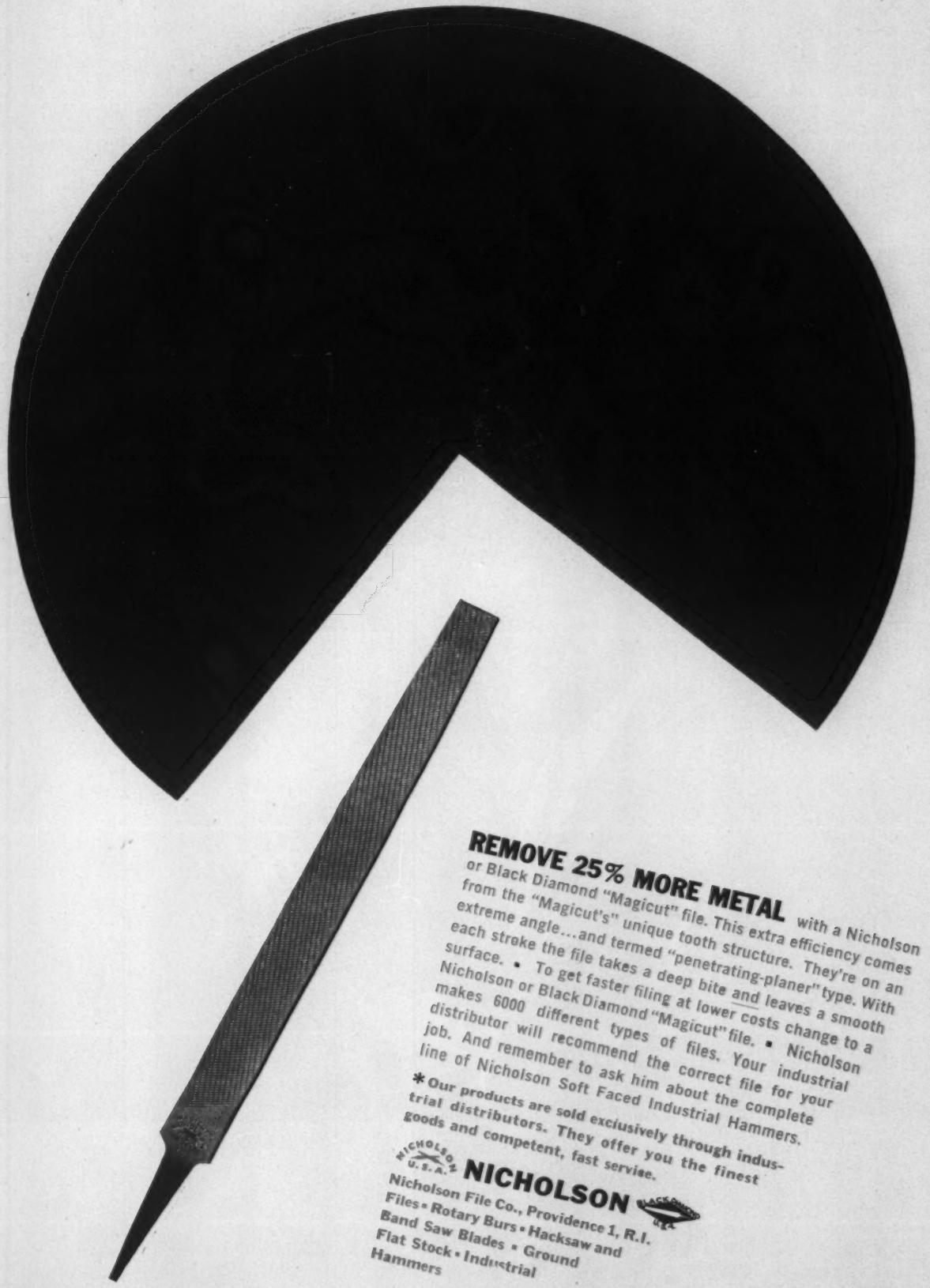
There are many advantages in using laminate tooling. For example, the material costs alone are 15-20 pct less than that of tool steel. Fabricating economies gained through the ability to make tools faster and easier bring tool savings overall to 30 pct.

Machining time is cut in half. The weight is reduced; this makes handling easier. A plastic tool weighing about 35 lbs would weigh 45-50 lbs if it were all steel.

Permanent Investment—The laminated plastic can be economically modified for dozens of uses when the need for this tool is over. H. L. Hildebrand, Mgr., Fabricating Div., Taylor Fiber Co., tells us that some laminates used in tooling are modified for re-use as many as eight times in a 15-year period.

Laminates are suitable for virtually every job where molds, jigs and fixtures are required. They are among the strongest engineering materials known for their weight. With steel inserts to add additional backup strength or wear properties, they are useful for even the toughest service requirements.

PROBLEM SOLVERS—Steel inserts in laminated plastic have fitted the material to such uses as drill bushings in drill jigs and face-plate fixtures on lathes. Wear on the laminate is eliminated.



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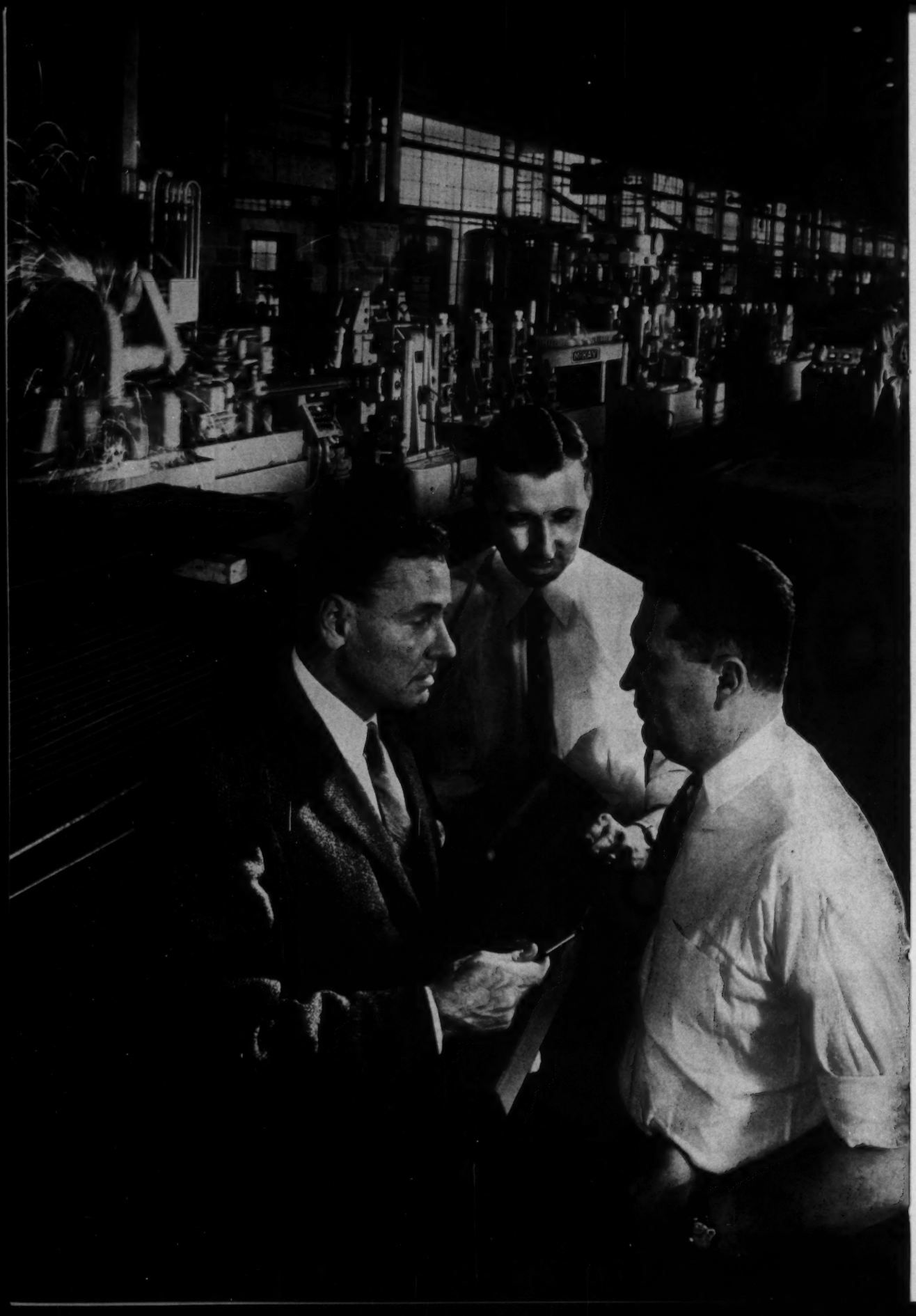
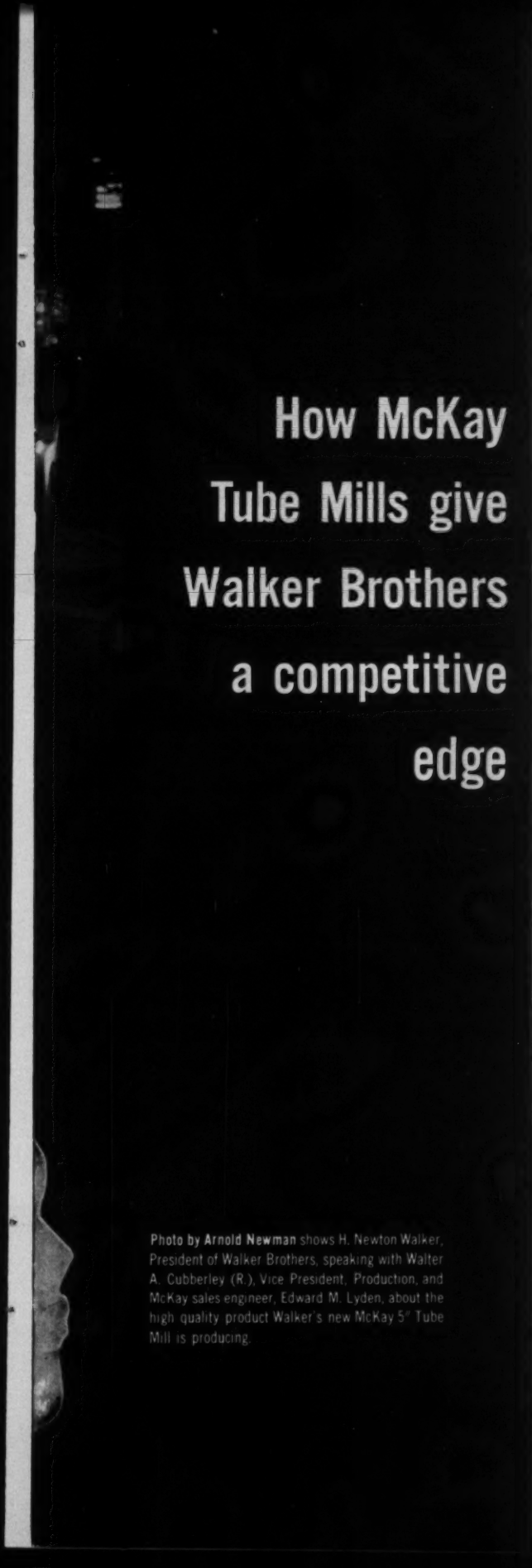




How McKay Tube Mills give Walker Brothers a competitive edge

Photo by Arnold Newman shows H. Newton Walker, President of Walker Brothers, speaking with Walter A. Cubberley (R.), Vice President, Production, and McKay sales engineer, Edward M. Lyden, about the high quality product Walker's new McKay 5" Tube Mill is producing.

"Our new McKay 5" Tube Mill enables us to extend our production range to the larger sizes of Walkerduct and steel tubing. The mill affords close manufacturing tolerances and improved control over production schedules," says H. Newton Walker, President of Walker Brothers, Conshohocken, Pa.

High Quality Product—Walker Brothers has been a primary supplier of high quality electrical distribution materials to the commercial and industrial construction industry for fifty years. "Walker of Conshohocken" products include building wire, power and control cables, mechanical steel tubing, steel electrical metallic tubing, rigid steel conduit and underfloor raceways.

"This is the third McKay Tube Mill we have installed since 1951 to increase our capacity to manufacture conduit and raceways," continues Mr. Walker. "Each of these mills," he says, "has turned out a product consistent with our high standards of manufacture."

Better Production Economies—Walker Brothers has, in addition to the new McKay 5" Tube Mill, two 3"-capacity McKay mills equipped with strip looping and welding equipment. These mills are generally used to produce ½" through 2" thin wall conduit on a continuous basis at a speed of 150 feet per minute. The new 5" mill also operates at 150 F.P.M. and at that speed can easily produce Walker's line of 6.5" x 1.5" x .076" rectangular raceway.

Mr. Walter Cubberley, Vice President, Production, states: "We have been most satisfied with the performance of this equipment. Performance of the McKay mill has more than met our expectations regarding versatility and cost savings."

Low Maintenance Cost—"There's something to be said for the design of this equipment, too," he says, "in that maintenance is, and has been, satisfactorily low regardless of the age of the machinery."

"This is very solid equipment, including the welder. In fact, I would say these are the best mills we could have selected for our type of operation," Mr. Cubberley concludes.

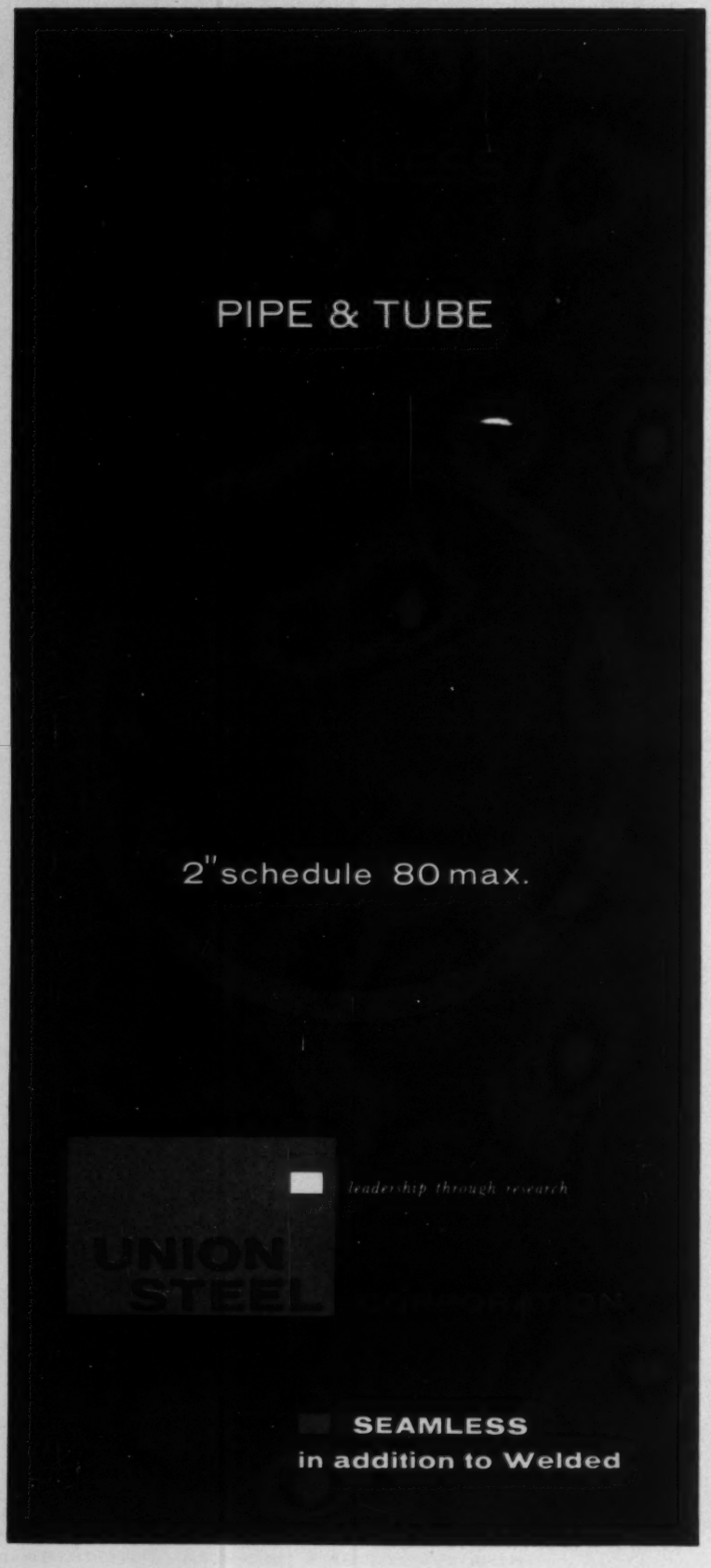
McKay Machine designs and builds electricweld tube mills for high speed production of ferrous and nonferrous welded tubing up to 20" in diameter. The experience of nearly 25 years of pioneering in the design of tube making equipment is behind each modern McKay Tube Mill.

Write for literature, or send a description of your needs for prompt quotation to McKay Machine Company, Youngstown 1, Ohio.

LOOK TO

McKAY MCK MACHINE

FOR PROGRESS IN METAL PROCESSING



PATENT REVIEW

New Patents In Metalworking

Tin-Coating Steel

Method of tinning steel strip, T. C. Toye (assigned to British Iron & Steel Research Association, London, England), May 17, 1960. Method of coating steel strip with a second metal, particularly tin, from a liquid source. The heated strip is cooled by a gas comprising equal parts of hydrogen and nitrogen while, at the same time, applying molten tin on both surfaces by means of rollers. No. 2,937,108.

Shapes Stainless Strip

Process of and apparatus for shaping metal strips being held under tension, F. C. Roxy, May 3, 1960. Process and machinery for shaping a flat strip of stainless steel into a strip shape of entirely different cross-sectional design. Tension is maintained in the strip as it is acted upon by progressive shaping dies. No. 2,935,110.

"Patent Review" now appears in The IRON AGE as a regular weekly feature.

Lifts Pit Cover

Operating mechanism for soaking-pit covers, H. F. Spencer, May 1, 1960. Design for a soaking-pit-cover carriage power car. It is adapted to be coupled with the cover and lift it, so as to permit charging or removing ingots. No. 2,936,906.

Steel Making

Method for making steel, B. M. Larsen (assigned to U. S. Steel Corp., Pittsburgh), May 10, 1960. Top-blow Bessemer-type apparatus and method for making steel, wherewith heat loss is minimized and all the potential heat of oxidation is used. This permits larger proportions of scrap in the charge. No. 2,936,230.

This Lindberg Furnace, Model CT3848-A, is being used at Ingersoll Milling Machine Company, Rockford, Illinois, for hardening Ingersoll inserted blade milling cutter bodies and also for gas carburizing. It is equipped with Lindberg's exclusive CORRTHERM electric heating elements. Temperature range 1850° to 2000°F.

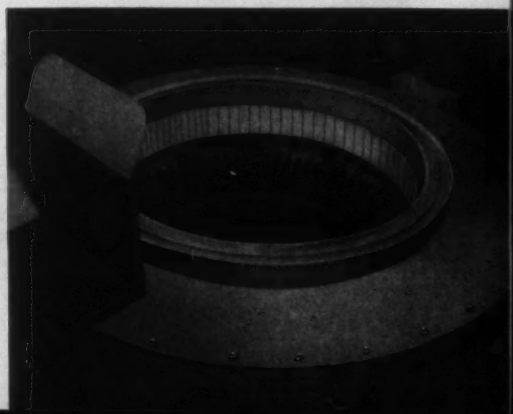
THIS VERSATILE LINDBERG FURNACE BELONGS IN MOST ANY METAL WORKING OPERATION

Heat treating installations across the country, captive or commercial, have found the versatility and dependability of this Lindberg furnace, either electric or fuel fired, a great production asset. Used at Ingersoll for hardening and carburizing, it is also ideal for a variety of heat treating needs including normalizing, annealing and tempering. This furnace occupies little floor space, handles a large volume of production and its rugged construction keeps maintenance costs uniformly low. At Ingersoll, it is one of several Lindberg furnaces in regular operation. Others include pit and box type Lindberg Cyclones and an L-type Furnace. Atmospheres are provided by Lindberg Hyen Generators.

Lindberg has developed a wide variety of equipment for any industrial heat treating requirement. We provide everything from individual furnaces to complete, automated heat treating installations. These can either be factory-built or installed in your own plant. For the most satisfactory answer to any heat treating problem see your local Lindberg field representative (consult your classified phone book) or write direct to Heat Treating Division, Lindberg Engineering Company, 2452 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Limited, Toronto.

Fixture being loaded with work while furnace is treating another load. Treated load will be removed and new load inserted quickly and easily.

CORRTHERM heating elements operate at extremely low voltage so heat leakage through carbon saturation is eliminated and shock or short hazard prevented. Makes possible use of electricity for carburizing without furnace retort.



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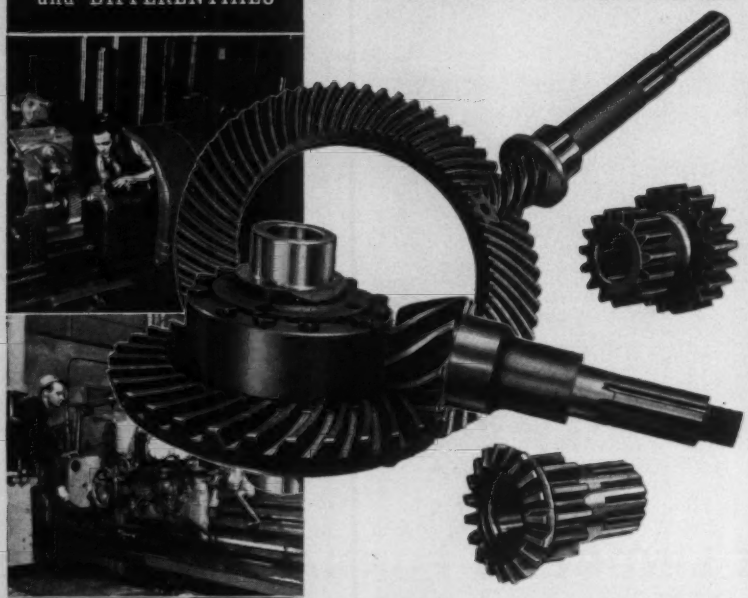

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Simple arithmetic explains why, TODAY, many of America's leading machine makers no longer undertake to solve the problems involved in production of gears, differentials, and specially designed gear parts. For them, FAIRFIELD IS THE ANSWER!

Every facility is available at Fairfield — latest, cost-cutting, ultra-modern metal-working and heat treating equipment, kept busy by volume production, *plus* expert engineering counsel. This makes for economy and efficiency that can benefit YOU.

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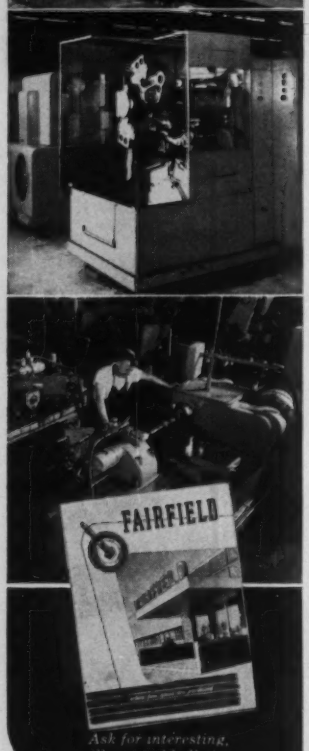

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FREE LITERATURE

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 95.

Cleans Aluminum

A technical bulletin describes a process which cleans wrought or extruded aluminum; removes all micro-corrosion and imparts to the surface a smooth silvery appearance. (Frederick Gumm Chemical Co.)

For free copy circle No. 1 on postcard, p. 95

Information System

Operation of a digital information system, using all solid-state components, is described and illustrated in an 8-page bulletin. Complete specifications are listed along with a variety of readout devices. (Bailey Meter Co.)

For free copy circle No. 2 on postcard, p. 95

Cutting Tools

Easy-to-use, a cutting tool catalog is divided into two separately-bound catalogs. One is for high-speed steel and carbide end mills, and the other for high-speed steel and carbide milling cutters. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 3 on postcard, p. 95

Gate Valve

A four-page, two-color circular describes a bonnet bronze gate valve. Sectional views detail the features of the bronze gate valve. Also included is a table of dimensions. (The Lunkenheimer Co.)

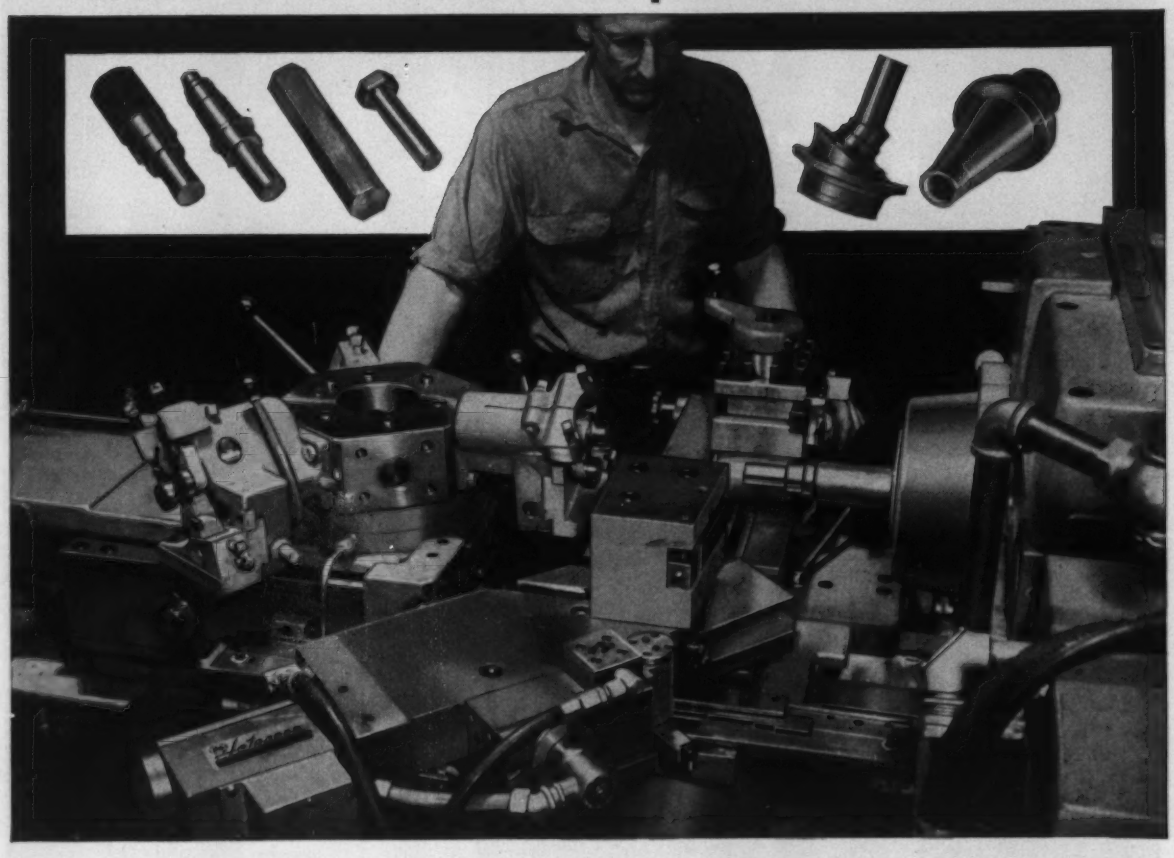
For free copy circle No. 4 on postcard, p. 95

Live Centers

Twelve pages in a folder describe a complete new line of live centers. This folder contains illustrations, diagrams and specifications of this precision-built live center with accuracy better than 0.0001 in. (J&S Tool Co.)

For free copy circle No. 5 on postcard, p. 95

Want to cut costs on parts like these?



Here's how tracing will help you save

The simple, basic setup shown above handles nearly 300 different parts for a well-known manufacturer of drive line components. All work is performed on one Gisholt MASTERLINE No. 4 Ram Type Turret Lathe with a JETracer on the rear of the cross slide. Standard tools on the hex and square turrets are used to face, chamfer and reduce the stock while the JETracer finishes all diameters, steps, blends and radii. The 6⅜"-long, 2"-diameter stepped shaft (above at left) is typical and is completed in two operations with total f.t.f. time only 4.95 minutes.

Here are just a few things the JETracer can do for you:

- **Shorten setup and change-over time**
- **Simplify machining and eliminate operator errors**
- **Save cost of form tools, multiple tool blocks and holders**
- **Reduce inspection time (only one length and one diameter need checking)**
- **Minimize or eliminate secondary operations (through finer finish, greater accuracy)**
- **Increase production through automatic machining of complex surfaces**
- **Free operator to handle extra units or perform other work**

Gisholt has developed a complete line of JETracers for use with ram and saddle type turret lathes, automatic turret lathes and single-spindle chucking lathes. These include rear cross slide, turret and independent slide mounted units, single or multi-pass types. *All are designed to operate at full capacity of the machines to which they are applied, without limiting machine functions or restricting the use of standard tools.*

You'll want to see for yourself how the JETracer adds flexibility, speeds operations and cuts costs on standard and problem parts. Send the coupon today for your free copy of the new JETracer catalog, or call your Gisholt Representative for complete information.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT FACTORY-REBUILT MACHINES WITH NEW-MACHINE GUARANTEE

Gisholt Machine Company
1215 E. Washington Ave.
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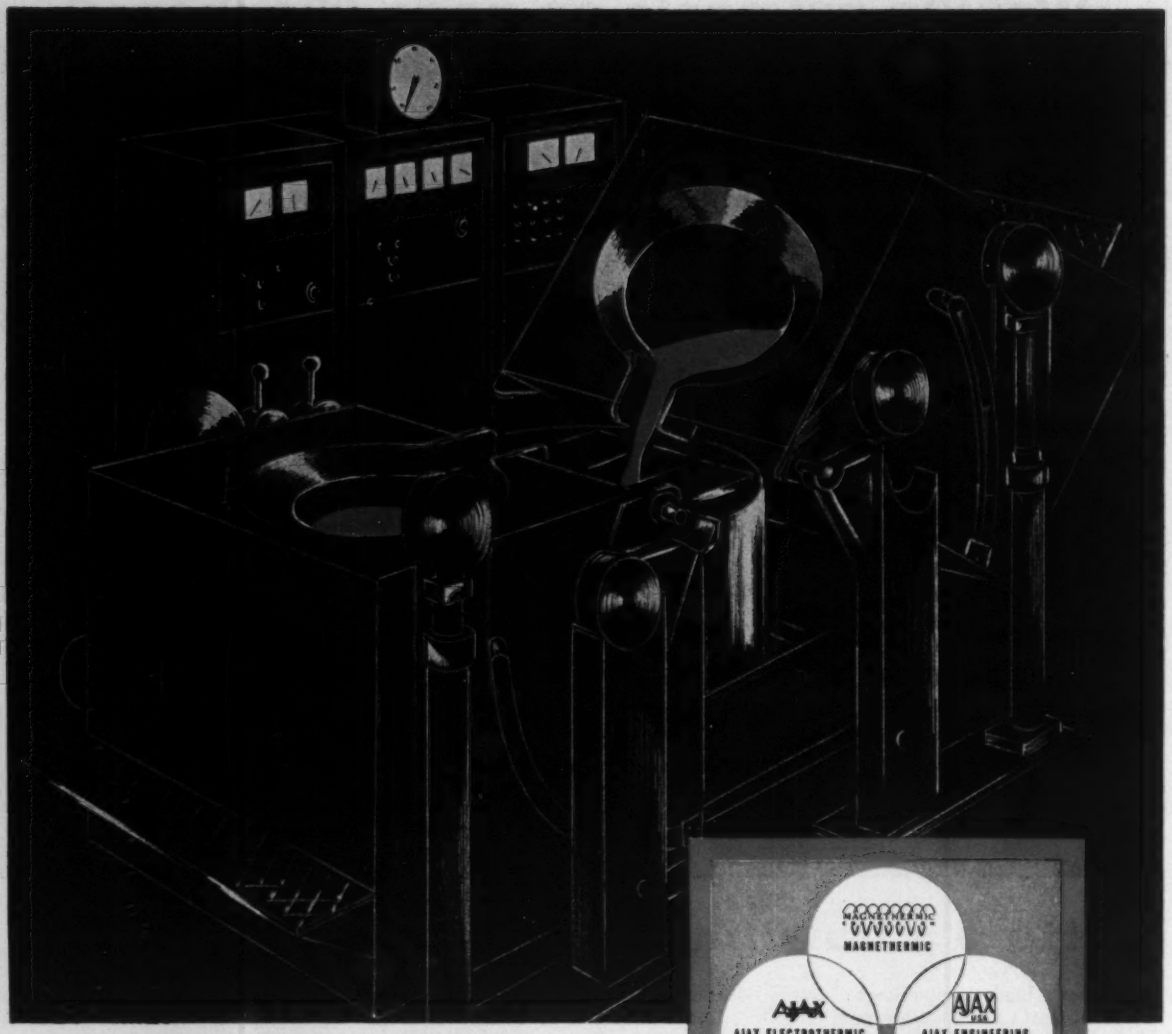
Please send a copy of the new Gisholt JETracer catalog.

Name.....*Title*.....

Company.....

Street address.....

City.....*Zone*.....*State*.....



These twin 1000-lb. melting furnaces prepare copper for metal powder at the St. John's, Michigan, plant of Federal-Mogul-Bower Bearings, Inc.

WATCH AM

FOR THE NEW IDEAS IN HEATING AND MELTING BY INDUCTION

Copper Melting Furnaces, one of many products of AM, for the heating or melting of metals by Induction.

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FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

Tubing

A four-page technical bulletin contains a quick reference weight chart, for square and rectangular welded steel tubing. The bulletin contains a comprehensive listing of square and rectangular welded tubing tolerances for twist, straightness, cutting length, corner radii, and diagonal dimensions. (The Standard Tube Co.)

For free copy circle No. 6 on postcard

Finishing Methods

Covering the abrasive finishing of die-cast and rolled zinc, an information sheet gives such data as polishing wheel speeds and type of buff; also, recommended abrasive compound. Hand and automatic setups, using both bar and liquid compounds, are covered. (The Lea Mfg. Co.)

For free copy circle No. 7 on postcard

Two-Cycle Engine Oil

Oil for two-cycle engines is described in a bulletin. Specifications, advantages, and test results for the 2-cycle engine oil are included. The oil is made for use in engines where lubricating oil is mixed with gasoline to power chain saws, pumps, generators, railroad motor cars, and scooters. (Sun Oil Co.)

For free copy circle No. 8 on postcard

Blow Molder

Described in a bulletin is a dual-manifold blow molding machine. Some of its many applications, in the rapidly-expanding field of blown plastics, are included in the four-page folder. The blow molder is designed for efficient operation on a fully-automatic basis, as well as for maximum flexibility in semi-automatic or manual operation. The folder also contains complete specifications for the blow molder, as well as an analysis of the design-versatility of the blow molding process. (F. J. Stokes Corp.)

For free copy circle No. 9 on postcard

Weld Grinding

Grinding wheels for the welding trade are described as to its uses and properties. Photographs and tables amplify the text to help the user determine the correct wheel for every job. A net price supplement is included in the booklet. (Norton Co.)

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Foot Switch

Consisting of two pages, a bulletin describes a foot switch. The switch can be used with punch presses, riveting machines, resistance welding, machine tools, machines for bending and forming, and in control circuits as a pilot device. The bulletin includes picture of switch, rating chart, diagrams and price list. (General Electric Co.)

For free copy circle No. 11 on postcard

Table Feeder

A four-page bulletin covers data on a table feeder. Features, advantages, description and operation, feed range and capacities, accessories and dimensions are covered in detail for this feeder. (B-I-F Industries)

For free copy circle No. 12 on postcard

Welding Case Histories

Successful applications of the manufacturer's welding electrodes and wires, in a variety of industries, are supplied in an eight-page folder. (The McKay Co.)

For free copy circle No. 13 on postcard

Transmitter

Brief but informative, a bulletin describes a transmitter as an inexpensive yet rugged instrument. The transmitter is capable of measuring pressures as high as 250 psi or ranges from as low as 0 to 100 in.

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FREE LITERATURE

of water. Operating on the simple force-balance principle, the device transmits a linear 3- to 15-psi signal to any standard receiver element. The bulletin shows typical applications of the device as a pressure transmitter and as a liquid-level transmitter. It illustrates exclusive design features. (Conoflow Corp.)

For free copy circle No. 14 on postcard

Switch Assemblies

A two-page data sheet describes a series of tab-indicator toggle switch assemblies. The paddle-shaped tab enables easy identification of the lever position. It will maintain a bright metallic appearance through long and constant use. Snap-action contacts insure accurate repeatability. (Micro Switch)

For free copy circle No. 15 on postcard

Pressure Regulators

Giving up-to-date information on a complete line of sliding gate pressure regulators, an eight-page catalog describes in detail the self-operated, pilot-operated, solenoid operated and back pressure regulators. The catalog describes the applications of each of the four basic types of regulators and how each type works. (OPW-Jordan)

For free copy circle No. 16 on postcard

Packing Chart

A packing recommendation chart shows maintenance and engineering personnel the proper packing types to choose for specific applications. This new chart, on stiff paper stock suitable for posting on the wall, suggests seven basic packing types for 95 pct of all packing needs. (Raybestos-Manhattan, Inc.)

For free copy circle No. 17 on postcard

Elevator Furnaces

Presented in a bulletin is the updated and expanded line of elevator furnaces equipped with neoprene-sealed retorts. As well as containing tabulated specifications covering the 32-model line, the bulletin describes chief operating features of the furnaces in providing low dew points for brazing, annealing, hardening and sintering at temperatures up to 2300°F. (Harper Electric Furnace Corp.)

For free copy circle No. 18 on postcard

Arcwelding Machines

An eight-page bulletin describes fourteen special, high-production, automatic, arcwelding machines with emphasis on production rates obtainable. The bulletin shows special features for automatic operation such as mechanical loading, inspection and automatic unloading. (The Taylor-Winfield Corp.)

For free copy circle No. 19 on postcard

Finishing Machine

Describing a combination finishing machine, a four-page bulletin presents numerous action photographs and text detailing the specific operations that this machine can perform. The bulletin also includes complete specifications and catalog listings. (Rockwell Mfg. Co.)

For free copy circle No. 20 on postcard

Variable-Speed Drives

Consisting of six pages, a folder describes constant-horsepower variable-speed drives. They are designed to meet capacity demands up to 50 hp and ratios up to 5.5:1. The folder also illustrates types of assemblies and sizes available, speed variation ratios and selection data. (Link-Belt Co.)

For free copy circle No. 21 on postcard

Motors and Blowers

Described and illustrated in a 12-page catalog is a complete line of fractional-horsepower electric motors, blowers, replacement kits, brackets, fan blades, and accessories. Replacement motors for air conditioning units from ⅓-2 hp are also included. Dimension diagrams, charts showing horsepower ranges, and air delivery graphs are included. (Redmond Co., Inc.)

For free copy circle No. 22 on postcard

NORTHERN Cranes for general industrial handling

General industrial handling service—of any and all shapes, sizes and weights of loads—whether boxed, bundled, cradled, crated, palletted, roped or chained—is more quickly, more precisely and more safely accomplished with a good overhead electric traveling crane than with any other form of material handling equipment.

In many plants Northern Cranes, operating at higher speeds and with highly precise electrical controls, in two-and three-shift service every day with production maintenance duty over week-ends, have records of long, continuous performance with minimum crane maintenance. They provide you with assured dependability.

The above 30/10-ton capacity Northern Crane, 57-foot span, serves the diversified needs of the receiving-shipping dock of an integrated automobile parts manufacturing plant.

MATERIAL HANDLING EQUIPMENT BY NORTHERN

Sales representatives in all principal cities.

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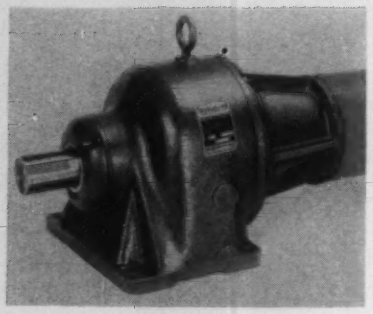
look overhead . . . see "NORTHERN"

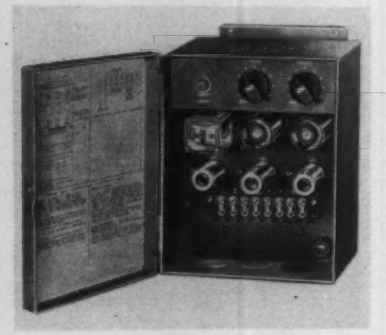
New Materials and Components



Reducer Integrates Easily with Driven Machine

A new series of speed reducers offers seven horizontal motorized models. Ratios are from 1.1:1 to 50,000:1 — 0.12:81.51 hp — and maximum output torque ranges from 50-113,000 in.-lb. One of the good features of this new series is the unified helical gear planetary element. This unified planetary element automatically equalizes the load distribution through the planetary gears by means of a "floating" principle. The series of speed reducers fits any standard "C"-flange motor. The units deliver more horsepower per pound of weight. (Winsmith, Inc.)

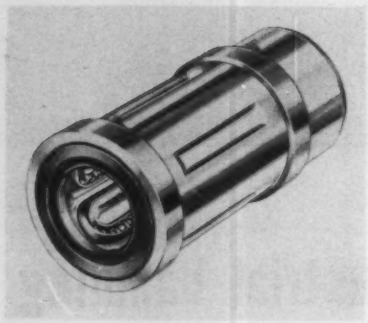
For more data circle No. 30 on postcard, p. 95



Counter Controls Industrial Processes

Fully electronic, a predetermining counter is capable of batching in quantities up to 100. Its features are: high speeds, no moving parts to wear, instantaneous reset to zero at the completion of each batch. Automatically controlling industrial processes, the counter actuates equipment at any pre-set count from 2-100, at speeds faster than 1000 operations per minute. The batch count desired is set on direct-indicating switches. When this count is reached, a control relay closes momentarily (100 milliseconds) to operate any external device. The counter resets to zero, and continues the counting process. (Standard Instrument Corp.)

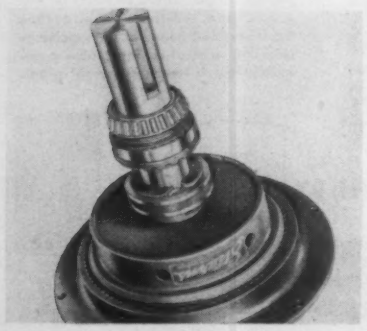
For more data circle No. 31 on postcard, p. 95



Linear Ball Bearings Serve on Die Sets

Designed specifically for use on die sets, ball bushings are interchangeable with standard plain bronze or steel bushings in existing dies. The bore diameter is dimensioned to fit standard guide pins in use today. Simple bushing replacements make anti-friction die sets, which improve the performance of the dies and reduce tool-room costs. In the press room, ball bushings allow closer fits and maintain alignment which increases die life and permits longer uninterrupted runs. Fewer sharpenings and sustained parts accuracy also result. Unlimited travel permits die to be used in any press regardless of stroke. (Thomson Industries, Inc.)

For more data circle No. 32 on postcard, p. 95



Multiple-Disk Clutch Fits into Small Spaces

Electro-magnetic, a multiple-disk clutch has friction elements placed on the outside diameter of the magnet body. In this manner, a longer torque arm is possible for a given size unit. The friction area is also comparatively greater. The unit comes in 2-, 4- and 6-disk friction surfaces with convenient adjustment features to compensate for lining wear. The principal advantage of the clutch's design is its adaptability to mount in certain engine housings and power take-off units. The driven member or clutch cage is flanged for attachment to engine flywheels or other driven mechanisms. (Stearns Electric Corp.)

For more data circle No. 33 on postcard, No. 95

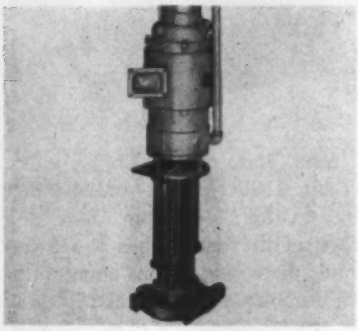
Filler Cap

With 30-mesh brass wire screen, a filler cap is used for hydraulic fluid and oil reservoirs. Breather caps are of the vented type of cadmium-plated steel, with twist locking action that fastens securely into the flange. The close neck flange is also of cadmium plated steel with six 7/32-in. flange holes drilled on a 2⅞-in. circle. The quality constructed screen is 3-in. deep and 1-5/16 in. in diam. (The Lenz Co.)

For more data circle No. 34 on postcard, p. 95

Molten-Metal Pumps

With fully-cooled shaft and bearings, a line of molten-metal pumps provides safety in handling liquids and molten metal up to 1300°F. This pump can be cooled either by circulating a small stream of water through ¼-in. fitting provided with the unit; or with com-



pressed air as a cooling medium when handling molten lead, or stereotype metal up to 800°F. The standard unit is furnished complete with necessary fittings and lift loop for simple installation and easy removal when desired. (The Ruthman Machinery Co.)

For more data circle No. 35 on postcard, p. 95

Tool Holder

For positive adjustment of finer finish cuts to fifty millionths of an inch, a tool holder is designed for use on the company's second operation machines and chucking machines. It can also be used on jig borers, screw machines and milling machines for holding boring tools. The tool holder permits instant adjustment by means of a totally new concept: A taper screw acts as a wedge and flexes the body of the tool holder in relation to the shank. The tool holder is particu-

larly recommended for production tolerances less than 0.0005 in. (Hardinge Bros., Inc.)

For more data circle No. 36 on postcard p. 95

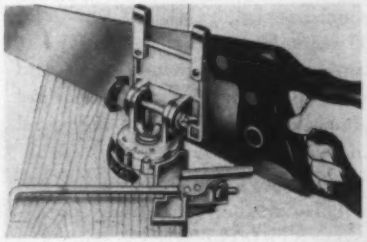
Cascade Control

A remote-control station, contains all the panel-mounted components needed for pneumatic cascade control of a process. The cascade station receives measurements from two different points in the process, recording them on the same chart. The new station, designed to save panel space, occupies only 6 x 6 in. of panel frontage. (The Foxboro Co.)

For more data circle No. 37 on postcard, p. 95

Miter Gage

Made of die-cast alloy, a scientifically-designed miter gage consists of a clamping base in form of an angle piece, to which is attached a swivel base, 2⅜ in. in diam, made up of upper and lower notched disks.



These disks are notched in 5° calibrations permitting mitering in degrees from 90° to 45°. In other words from 0° to 45° in either direction in 5° calibrations. Attached to the swivel base is a backing guide and plate. This is the

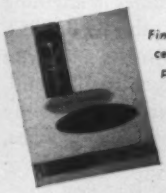
"the HITCHINER way..."

allows flexibility in design with INVESTMENT CASTING

This part is a carrier for a stripper on a citrus peeling machine. It is typical of thousands of irregularly shaped components that are designed with only a particular function in mind and no compromise with production limitations. This type of metal part often requires several changes before the design is finalized.

A late design change in this part, cast in 303 stainless steel, incorporated a 45° bevel, top and bottom on both sides of the serrated pad section. The tooling was altered at very little cost while the cost of the finished casting was not increased at all. The relatively low cost of tooling and tooling changes make the investment casting process an economical and flexible method.

Flexibility in design, a wide freedom of choice in alloy and the elimination of expensive machining operations made possible with the investment casting process may help you solve your parts problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.

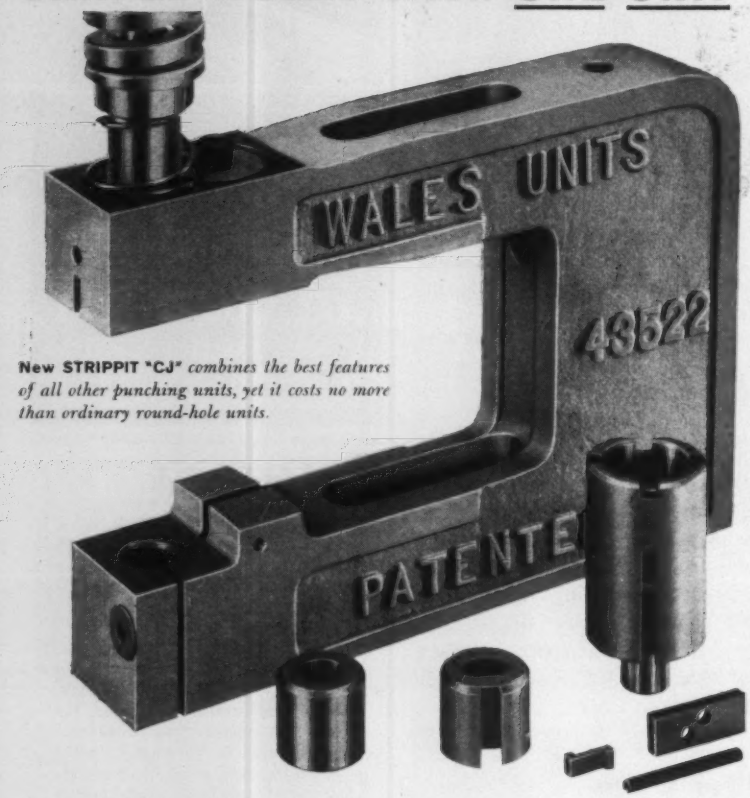


Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

HITCHINER
MANUFACTURING COMPANY INC.
MILFORD 20, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

NOW! PUNCH BOTH ROUND AND SHAPED HOLES WITH ONE UNIT



New STRIPPIT "CJ" *combines the best features of all other punching units, yet it costs no more than ordinary round-hole units.*

Here's greater versatility than ever before in a self-contained hole punching unit. STRIPPIT "CJ" holders and die bases are keyed to take shaped parts. And you pay no more for the "CJ" unit than any competitive round hole unit.

If your current metalworking requirements call for round holes in anything up to ¼" mild steel, the STRIPPIT "CJ" fills the bill. But let's say you get a future job that requires obround, square or rectangular holes. Simply substitute the proper shaped punches, punch guides and die buttons. They're always in stock. You save the cost of a complete new unit or the inconvenience of returning your existing unit to the factory for keying.

Of course you get the same quality which has made STRIPPIT famous for 35 years. Holders are metallurgically correct for their punching range. And a far superior one piece shoulder head punch is standard in both the round and shaped series.

Write now for full information and prices on the new time-saving, money-saving STRIPPIT "CJ".

WALES **STRIPPIT** INC.

A UNIT OF HOUDAILLE INDUSTRIES, INC.

202 Buell Road • Akron, New York

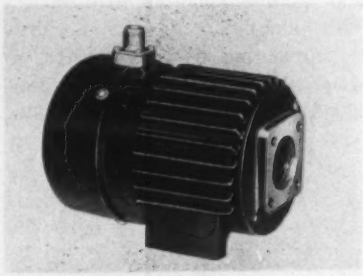
In Canada: Strippit Tool & Machine Company, Brampton, Ontario.

plate which holds the saw. It may thus be seen that the backing plate rotates left or right for angle cuts, and backward for compound miter angles. In use, the device is attached to the work, the swivel base set at the desired angle, the saw inserted and the cutting started. (Nielsen Saw & Mfg. Co.)

For more data circle No. 38 on postcard, p. 95

Low-Voltage DC Motors

Three models of low-voltage dc motors are suitable for general use. They may be obtained with or without radio suppression. Winding designs offered are shunt, compound, or series type. Typical ratings are:



1/6 hp, 3500 rpm, 12- or 24-v dc; ¼ hp, 2100 rpm, 12- or 24-v dc; and ⅓ hp, 3600 rpm, 24-v dc. Each of the motors has a 5½-in. frame diam, and weighs about 14.5 lb. (Robbins & Myers, Inc.)

For more data circle No. 39 on postcard, p. 95

Bearing Balls

Carburized steel bearing balls help meet the demand for precision bearing assemblies at lower cost. Diameter tolerances for balls of these grades are 0.000050 in. and 0.000025 in. respectively. (Pioneer Steel Ball Co., Inc.)

For more data circle No. 40 on postcard, p. 95

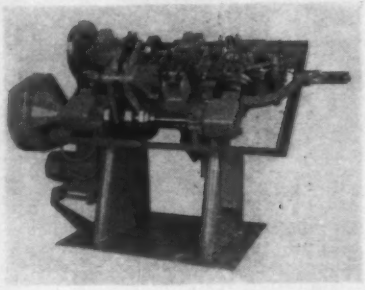
Starter

Dimensionally small in size, a magnetic, non-reversing starter satisfies about 40 pct of all general-purpose applications. It is designed for use with both polyphase and single-phase motors. Cover control offered consists of "Reset" only; "Start, Stop-Reset" and "three position selector switch." (Cutler-Hammer)

For more data circle No. 41 on postcard, p. 95

New Equipment and Machinery

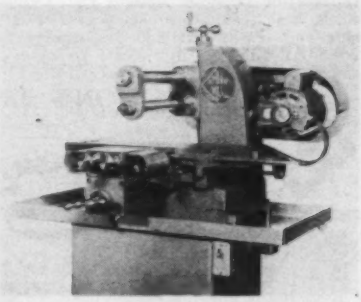
Forming Machine Operates from Any Angle



For the high-speed production of stamped and formed parts of ribbon metal or wire stock, a forming machine operates from a horizontal (0°) position to a vertical (90°) position. Its flexibility and versatility afford considerable time saving in tool setup and maintenance. It will form and eject parts without restriction, due to its operating angle. The unit can be utilized with automatic receiving equipment. The machine will accept feed lengths up to 8½ in.; wire-diameter mild steel to 3/32 in.; and ribbon metal stock widths to 1½ in. (The Baird Machine Co.)

For more data circle No. 42 on postcard, p. 95

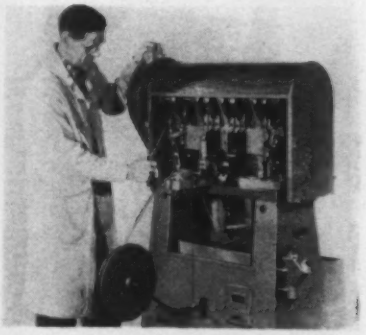
Milling Machine Features Foolproof, Positive Feed



Designed for light-duty production at low initial cost, a milling machine has completely-hydraulic feed; also, infinite table speed in both directions from 0-600 ipm. The table is 6 x 24 in., and has 10-in. travel and 4½-in. transverse travel. The hydraulic system has only three main parts for easy, quick service, and it provides change over on feeds in less than a minute. Some of the machine's specifications are: four spindle speeds ranging from 500-2050 rpm from ¾-hp motor; 7-in. maximum from table to center of spindle. (Northern Illinois Machinists)

For more data circle No. 43 on postcard, p. 95

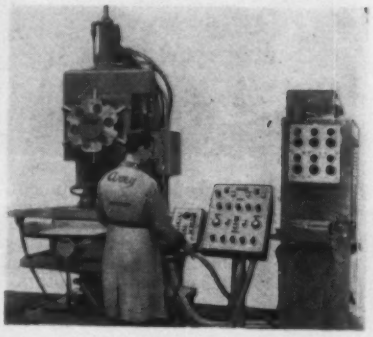
Slide and Transfer Press Halves Tooling Costs



Available in capacities of 3 and 9 tons, a combination multiple slide and transfer press can blank, pierce, form and bend in one, single continuous operation. It does this at speeds up to 100 strokes per minute. Tooling is divided into separate units. The press is ideal for short-run operations. The press' accurate distortion-free primary blanking insures accuracy. There is no bending or twisting of the stock as can take place in conventional progressive die operations. Since all tool holders are individually adjustable for height, changes to new parts are easily made. (E. W. Bliss Co.)

For more data circle No. 44 on postcard, p. 95

Drilling Machine Performs Many Operations



With its power-indexed turret, a six-spindle turret drilling machine performs many different operations at one work position. Such operations are: drilling, tapping, reaming, boring, countersinking, chamfering, bottom drilling and deep-hole drilling. Drilling capacity in mild steel is 1¼ in. Any spindle may be skip indexed. All spindles have automatic depth control, with a micrometer adjustment on the depth stops. The infinitely-variable feed rate is from 0-120 ipm. All speeds, feeds, rapid advance and tapping cycles can be pre-selected on a convenient panel. Standard table size is 35 x 20 in. (Motch & Merryweather Machinery Co.)

For more data circle No. 45 on postcard, p. 95

Fine tools that encourage Good Work

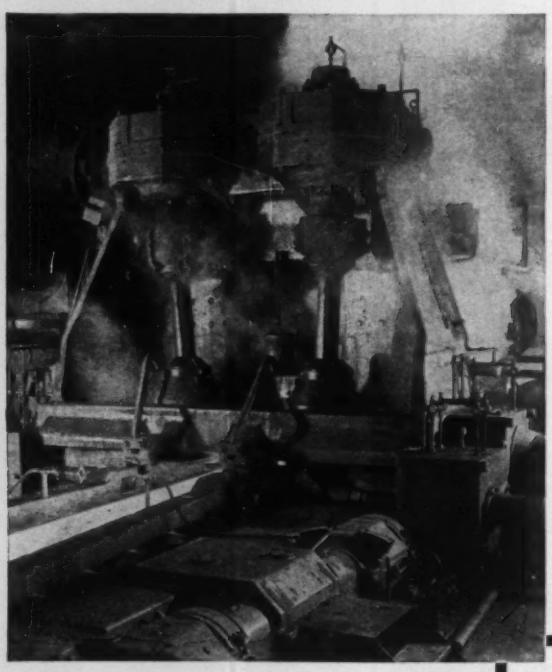
SEE US AT BOOTH 238 PRODUCTION ENGINEERING SHOW SEPTEMBER 6-16 NAVY PIER CHICAGO, ILL.

ARMSTRONG WRENCHES

If you don't know your local ARMSTRONG Distributor we will send you the name of those in your area.

An ARMSTRONG Wrench feels right—is balanced. It goes over nuts or screw heads easily, grips firmly without sloppiness, won't round corners—because openings are carefully machined to correct sizes. It's safe, strong beyond need without clumsy bulk—because of superior design and selected steels, heat treated to proper degree of hardness and tensile strength. It's quality finished. ARMALOY (alloy steel) Wrenches in chrome plate with heads buffed; HI-TEN (carbon steel) Wrenches in baked-on gray enamel with heads ground bright . . . all plainly marked for size. All are uniformly excellent tools manufactured under strict quality control, by modern methods, with modern equipment in a modern tool plant . . . 1537 different industrial sizes and types—single wrenches, or sets in metal cases, boxes or rolls . . . each a quality tool. Armstrong Wrenches are "Fine tools that encourage good work."

ARMSTRONG BROS. TOOL CO. 5209 W. Armstrong Ave. Chicago 46, U.S.A.



Edging hot strip steel

No place for second-best equipment. That's why this heavy-duty vertical overdrive edger uses rugged Cone-Drive **double-enveloping worm** gearing to drive the vertical rolls continuously.

Rugged Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

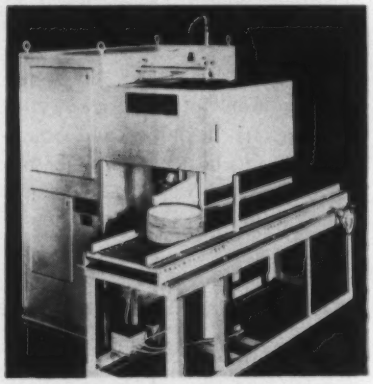
CONE-DRIVE GEARS

DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

NEW EQUIPMENT

Induction Heater

A 60-cycle induction heater anneals aluminum blanks. The blanks can be of various shapes, principally circular, rectangular or oval. The heater can anneal a range of blanks from 4-30 in. in diam, by use of the appropriate-sized coil. Each coil covers a given range of diameters.

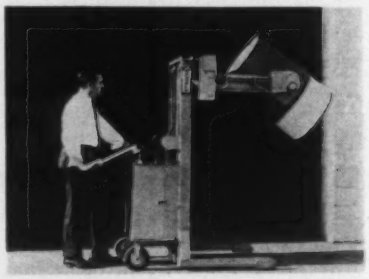


The unit heats the blanks in 12-in. stacks. Heat times range from a minute per stack in the smallest diameter to 40 minutes maximum for the 30-in. diam. Operation of the annealer is simple. (Ajax Magnethermic Corp.)

For more data circle No. 46 on postcard, p. 95

Drum Dumper

Designed for low-cost movement, lifting and emptying of drum containers, all models of a drum-dumper line rotate the drum 180°, at any point in the lifting range. This variable-height dumping fea-



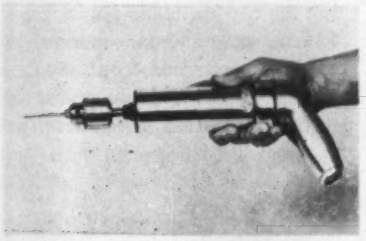
ture cuts costs by using one dumper to feed receiving hoppers of various heights. The drum dumpers can be completely powered for travel, grabbing, lift and dumping. One push button controls all the movements. The hydraulic turning device

furnishes clean, fast pouring of liquids, and its double action allows full control of the rotating drum; it can pour fast or slow or it can be quickly stopped and reversed for partial pours. (Uhrden, Inc.)

For more data circle No. 47 on postcard, p. 95

Pneumatic Tapper

Two new models of portable tapping machines provide high-speed tapping of small holes. Both models operate on the "push-pull" principle, and withdraw from the tapped holes at double the speed of entry, to reduce the man-hours involved in tapping operations. Both models are

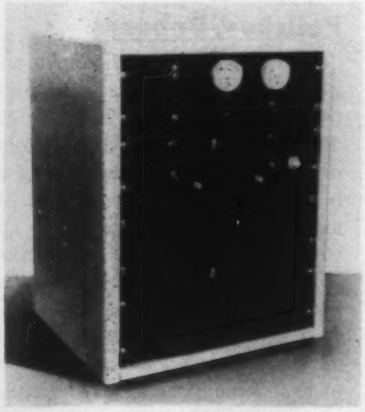


available with quick-release chucks, for operations where frequent size changes of taps or stud setters are required. Both are light in weight (4½ lb) for ease in handling and reduced operator fatigue. (Newage Industries, Inc.)

For more data circle No. 48 on postcard, p. 95

Ultrasonic Generator

Rated at an output of 1000 w average power, and 2000 w peak power, the generator will drive 192 sq in. of barium titanate crystal



radiating surface. The unit is recommended for conveyorized, batch or manual production-line cleaning and degreasing. It is also used to

Specify PANNIER STEEL STAMPS for a longer life of CLEANCUT MARKING

29,335 hammer blows—and still marking cleanly—Pannier Letter and Number Stamps

Rounded corners for finger comfort
Rounded head distributes impact, reduces mushrooming.
Type size identification
Added metal in Pannier fillet increases durability. Correct bevel gives clearer impression, longer life. Outside bevel longer than inside for protection of character face.

Made of the finest tool steel and correctly heat treated for best combination of hardness and toughness, Pannier single character stamps can take it! Scientific shaping and accurate engraving insure a long life of good, clear impressions. Available in letters, figures and special symbols, and in light, medium or heavy duty design.

Extra tough steel forging stamps for hot or cold, heavy duty marking

For stamping names, part or patent numbers, trade marks and similar markings, Pannier forging stamps are made in four styles:—Hand-style, fullered for wire handle and wood handle style with eye parallel or perpendicular to lettering. All are designed and heat treated for clear impressions and long service. All are covered by the Pannier Master Marker guarantee.

Supreme Holders with "Roto-Pin" for quick, easy number change

An easy, half-turn flip for Roto-Pin releases any or all of the steel type for fast change. A reverse flip locks them in perfect alignment.

Roto-Pin makes this Pannier Master Marker a time saver in number change and makes serial number marking fast and efficient. The hardened anvil at the base of the type slot keeps type in perfect alignment for equal impression. Machined from bar tool stock, the Supreme Holder has a heat treated striking head. Both anvil and striking head are replaceable for longer life of the holder itself. Made in hand or wood handle styles, for hot or cold marking.

Write for literature

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MARKING DEVICES

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PANNIER MASTER MARKERS FOR QUALITY

HOW TO BEAT THE HEAT

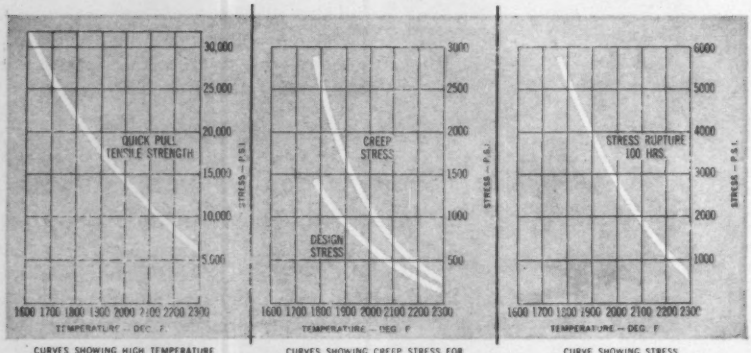
for strong high alloy requirements in the 1,800° to 2,300° F range!

DURALOY HOM*

*Covered by U.S. Patents

casting alloy

Duraloy "HOM" is a special high nickel alloy developed to produce castings that meet high temperature requirements, especially when castings are subject to oxidizing atmospheres.



CURVES SHOWING HIGH TEMPERATURE SHORT-TIME TENSILE STRENGTH OF DURALOY-HOM

CURVES SHOWING CREEP STRESS FOR CREEP RATE OF 1% IN 10,000 HOURS AND RECOMMENDED DESIGN STRESS FOR DURALOY-HOM

CURVE SHOWING STRESS TO RUPTURE AT 100 HOURS FOR DURALOY-HOM

Castings of DURALOY "HOM" are now being produced by our three methods: static, centrifugal and shell molded. Write today for additional information on this versatile new alloy.

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CHICAGO OFFICE: 332 South Michigan Avenue

DETROIT OFFICE: 23906 Woodward Avenue, Pleasant Ridge, Mich.

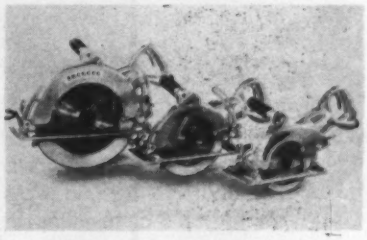
NEW EQUIPMENT

add ultrasonics to a conventional vapor degreaser or other cleaning equipment. The unit operates on 115 v at 20 amp. It is 21¾ in. wide, 18 in. deep and 28⅝ in. high, and powered by two vacuum tubes. It weighs 225 lb. (National Ultrasonics Corp.)

For more data circle No. 49 on postcard, p. 95

Portable Saws

Two new models have been added to the manufacturer's family of air-powered portable saws. Following the 6½-in. blade model are the 8¼-in. and 12-in. models. An efficient governor-controlled air motor transmits high power and torque through a spiral bevel gear



drive. The saws have operating speeds of 3000, 4800, and 6000 rpm. These saws may be used on masonry or on plastic, wood, aluminum, and other semi-hard nonferrous metals. (Buckeye Tools Corp.)

For more data circle No. 50 on postcard, p. 95

Polishes, Deburrs

Combined with nitric acid and water, a powder forms a solution for chemically polishing and bright dipping zinc die castings. The solution may be used before plating to brighten the subsequent plate. It may be used to improve the appearance and corrosion protection of die castings used without further finish. It may also be used to restore the finish to castings that have been spoiled through paint or plate stripping; corrosion in process of manufacturing. It produces an excellent finish for adhesion to paint or lacquer. (Conversion Chemical Corp.)

For more data circle No. 51 on postcard, p. 95

The Iron Age Summary

No Hope Now for a Record 1960

Early predictions of over 125 million tons now seem fantastic.

The best that can be hoped for is 115 million ingot tons this year, compared with 1955 record of 117 million tons.

▪ All hopes of a new record steel production this year have faded. The absolute best that can be hoped for is 115 million ingot tons.

And some of the analysts in the steel industry believe production may not surpass 110 million tons.

Early Hopes High—The all-time record production was set in 1955 when 117 million ingot tons were poured. Before the year started, a record of 125 to 130 million tons was confidently predicted on the basis of the strike-created backlog of demand.

Over the first six months of 1960, steel mills operated at about 82 pct of capacity and made 61 million ingot tons. If mills operate at an average of 70 pct in the second half, the total for the year will be 114 million tons.

Production Meets Orders — No hope is held out that the industry can hit 80 pct and 120 million tons for the year, the magazine reports. This would mean that the second half would have to be almost as big as the first.

Looking at the current low rate of production, output is being cut drastically to meet the low rate of new orders for steel. This week's low in production is the result of these factors:

1. **The July 4 holiday.**
2. **Plant-wide vacations.**
3. **Repair and rebuilding work.**
4. **Low rate of new orders.**

No Backlogs — In the weeks ahead, the operating rates will depend almost entirely on incoming orders. Backlogs are virtually wiped out. So are artificial factors (such as building in-plant inventory) which have kept the operating rate at a higher level than justified by the rate of new business.

But little significant pickup is expected until the seasonal factors of the summer letdown are past.

Automotive and some other major users of flat-rolled products continue to be the strong factors in the market. Railroads, appliance makers, oil and gas, and home building continue to depress the market with lower than expected orders.

Geographic Factors—Steel companies remote from their markets have been hardest hit. Users are filling their orders from mills closest to home to assure immediate delivery and to eliminate as far as possible dangers of carrying small inventories. This accounts for the wide variation in district operating rates.

From now on, the realistic balancing of production and orders will make the operating rate sensitive to new trends. Inventories of users will continue to be trimmed, but most of the excess is gone.

By cutting back production now, steel companies may have eliminated the need to take more drastic measures later in the summer.

But the industry expects a good pickup in orders during the latter part of August.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,254	1,560	1,756	2,252
Ingot Index				
(1947-1949=100)	78.0	97.1	109.3	140.2
Operating Rates				
North East Coast	54.0	61.0	65.0	80.0
Buffalo	41.0	56.0	61.0	86.0
Pittsburgh	35.0	48.0	61.0	80.0
Youngstown	12.0	42.0	39.0	73.0
Cleveland	41.0	59.0	67.0	74.0
Detroit	65.0	82.0	79.0	80.0
Chicago	46.0	54.0	64.0	87.0
Cincinnati	29.0	50.0	64.0	85.0
St. Louis	56.0	61.0	77.0	81.0
South	60.0	62.0	62.0	78.0
West	62.0	63.0	69.0	68.0
U. S. Rate	44.0†	54.8	61.6	79.5

*Revised †IRON AGE Estimate

Source: American Iron And Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.41	$66.41	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$31.00	$31.00	$31.50	$39.17
No. 2 bundles	$20.83	$20.83	$21.17	$26.67
Nonferrous				
Aluminum ingot	28.10	28.10	28.10	26.80
Copper, electrolytic	33.00	33.00	33.00	31.50
Lead, St. Louis	11.80	11.80	11.80	11.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	102.625	101.75	101.00	103.00
Zinc, E. St. Louis	13.00	13.00	13.00	11.00

P.A.'s Report Business Leveling

Business holds at a satisfactory point, but is not what it was expected to be.

Those companies reporting gains are offset by those with declines, says the National Assn. of Purchasing Agents.

■ Business continues on a plateau. Generally, it remains satisfactory. At the same time, it is not living up to earlier predictions, says the National Assn. of Purchasing Agents in its monthly report for June.

Production and new order figures reflect the "leveling off" phase business is now in. The trend for the past five months has been steady in that companies reporting gains are just about offset by those reporting declines.

Six of One—In June, 27 pct of companies reporting in the NAPA survey said they had increases in new orders. However, 26 pct reported a decline. Similarly, 24 pct said production for their companies went up, and 22 pct said it went down.

No great change has taken place in other areas of the business survey, NAPA says. Employment is down from May. Inventories continue to diminish, but there are indications that the low point is near.

Prices Soften—Commodity prices are softening as the result of keen competition and the development of a "real buyer's market." Buying policy is cautious and there is an indication that most purchasing agents are holding their forward commitment time to a minimum.

While this status quo situation apparently exists in domestic business conditions, the international situation grows increasingly tense, the report says. With collapse of the Summit talks and anti-U. S. feelings vented in several countries, NAPA polled its members to see if these conditions were affecting their procurement programs.

No Harm Done—"Not a bit," said 95 pct. In fact, 13 pct are still following an aggressive policy of further shortening of lead time. Only 5 pct said possible shortages of materials obtained from abroad or shortages caused by domestic requirements for defense purposes, were causing them to extend forward commitments to protect future needs.

Inventory liquidation continues. Lower inventories were reported by 31 pct of companies polled. Only 18 pct said they had increased stock on hand. One of the reasons often given for continuing reductions in purchased materials' inventories is the offsetting increasing inventories of finished goods. A number of companies say they feel the "bottom has been about reached."

Regarding employment, most companies report satisfactory levels. Of companies surveyed, 12 pct report higher employment, 63 pct said they have had no change, and 13 pct say employment is down. Also, some who report no change in employment tell of shorter hours or shorter work weeks as a hedge against layoffs. None said the employment situation is critical.

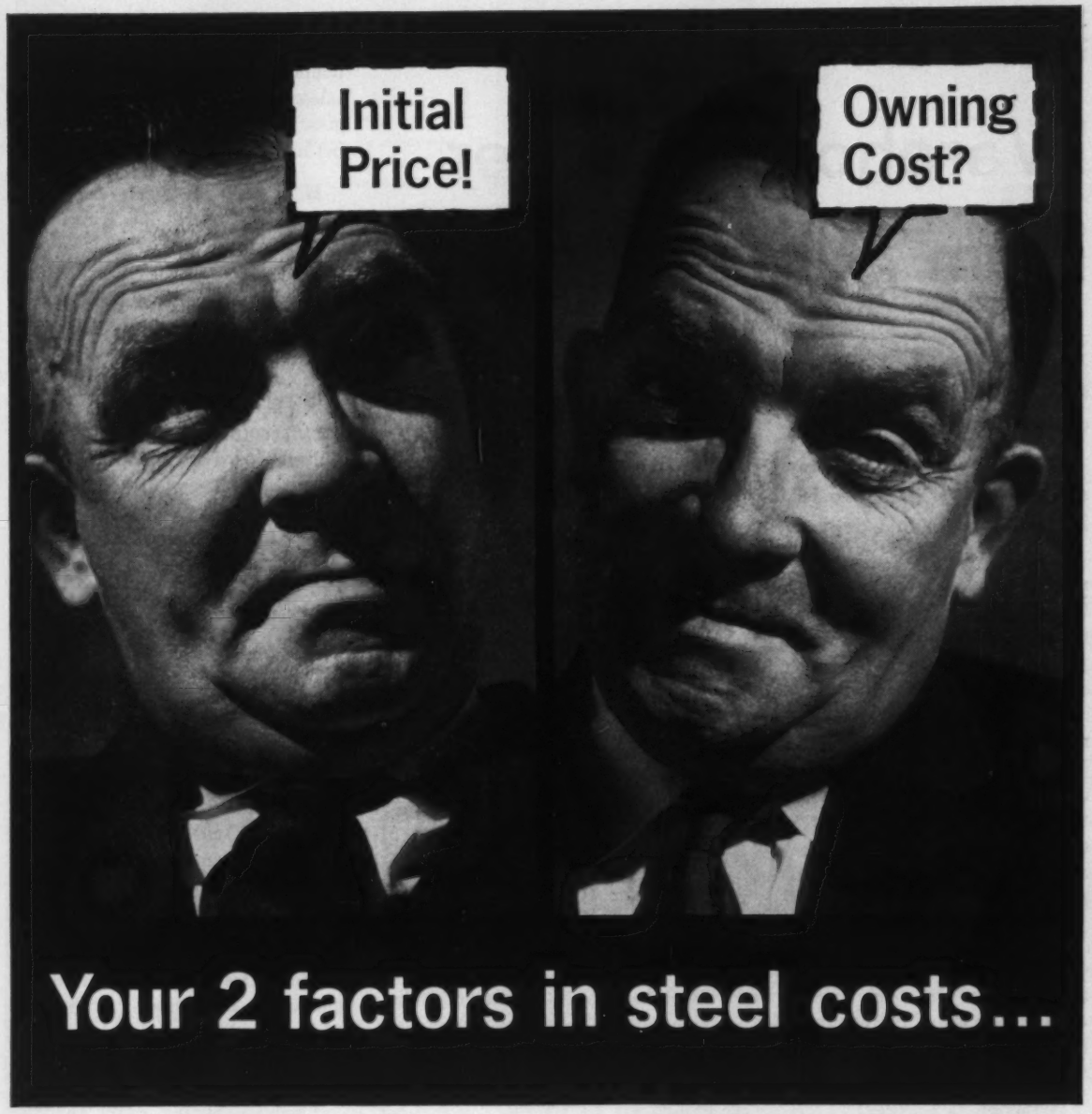
In the commodities, price fluctuations were noted during June in some highly seasonal items. Included are fresh vegetables, dairy products in areas where climate affects crops and grazing.

Up were raw sugar, gasoline, some petroleum oils, phthalic anhydride and plasticizers.

Down were steel scrap, lumber, large electrical equipment and steel drums.

How Buyers Bought in June

	Per Cent Reporting				
	Hand to Month	30 Days	60 Days	90 Days	6 Mos. to 1 Yr.
JUNE					
Production Materials	10	33	37	15	5
MRO Supplies	30	41	18	10	1
Capital Expenditures	11	8	10	21	50
MAY					
Production Materials	8	37	34	16	5
MRO Supplies	29	51	14	5	1
Capital Expenditures	11	5	13	25	46



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Each steel user's case is different. Your steel service center will be glad to help you determine the most economical way to buy and use steel by considering all your costs of possession, such as:

Cost of capital:	Cost of operation:	Other costs:
Inventory	Space	Obsolescence
Space	Materials handling	Insurance
Equipment	Cutting & burning	Taxes
	Scrap & wastage	Accounting

Call your steel service center, or write for free booklet, "What's Your Real Cost of Possession for Steel?"

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Steel

Warehouses Suffer From Mill Service

Steel service centers are getting it from all sides—mills and customers.

Smaller customers are placing smaller orders. Mills are taking big orders with fast delivery.

■ Steel Service Centers are pushing for orders, but they're meeting stiff competition from steel mills.

Reports from the Midwest indicate mills and cold drawers are stocking wire, bar and some standard structurals. The producers don't like to call it an inventory, but it amounts to one. In some cases, customers in the Chicago area are able to get mill delivery in 24 hours. This amounts to warehouse delivery at mill price.

Order Size Down—According to one source, the average order size ranges all the way from 1200 lb in central sections of the country to a little more than 750 lb per order in the West.

Warehouses are apprehensive that overall order size will drop below the 750 lb average reached at the low point in the 1958 recession. Some smaller service centers in the Midwest have been at the 750 lb level for at least two weeks.

Trimming Inventories — In Detroit, warehouses note that there are just as many orders now as a year ago. However, the size of the orders is less. Users are maintaining tight inventories, buying what is needed when it's needed. Fast delivery is important.

This type of market is expected to last through the summer months. But warehouses hope for a rapid pickup in the fall. Meanwhile, they continue to pare inventories. This, too, is expected to continue throughout the summer.

Sheet and Strip—August orders are still spotty. A large sheet mill in **Pittsburgh** says its orders don't indicate a real upturn—yet. A smaller producer reports August will bring a "sizable improvement over July. In **Chicago,** strip mills are running at a slightly higher rate than sheet mills, but the difference is small. In any case, backlogs have disappeared and customers are slow in committing themselves in advance.

Coated Products—Other mills are adopting U. S. Steel Corp.'s pricing method for galvanized (The IRON AGE, June 16, 1960, p. 164). But producers point out that the new schedules have little or no affect on buyers as prices remain unchanged. Tinplate mills in the **Pittsburgh** district say releases have improved enough to give them storage space. Orders are good enough to sustain production at high levels.

Stainless—For the most part, producers feel the low point has been passed. But the level of business remains depressed. In **Pittsburgh,** producers believe the present lull is temporary. Producers and stainless salesmen in **Detroit** are banking on good automotive orders for September and October.

High Strength Steel—An ultra-high strength steel, MX-2, has been made available for general industrial use. It was originally designed and developed for missile motor case uses by Scaife Co., Pittsburgh subsidiary of Wilson Brothers.

MX-2 is a cobalt-modified, low-alloy, high-strength constructional steel, according to Maurice Parker, Wilson board chairman. He said the material has withstood 280,000 psi burst pressure in test. This is believed to be one of the highest levels attained with thin-walled construction.

Mr. Parker says it can be readily fabricated by rolling, forming, deep drawing, welding and machining. It also shows low sensitivity to weaknesses created by notches, cracks, and heat treatment.

Because Scaife is not a steel melter, Mr. Parker said, "the company is actively setting up a licensing program under which a reasonable number of qualified producers will be licensed to make and sell MX-2 directly to users."

More Ore Pellets — A 900,000 annual ton expansion of production of high-grade ore pellets is planned by Cleveland Cliffs Iron Co. at its Republic Mine, Republic, Mich.

Facilities at the mine and the concentrating and pelletizing plants are properties of the Marquette Iron Mining Co., operated by Cleveland-Cliffs and owned by Cliffs, Jones & Laughlin Steel Corp.; International Harvester Co., and Wheeling Steel Corp.

Capacity of the Republic plant will be boosted from the present 700,000 tons of iron ore concentrate to 1,600,000 tons per year.

Contract for construction of pelletizing has been awarded to the Arthur G. McKee Co., Cleveland. It will utilize the Allis-Chalmers grate-kiln.

PURCHASING AGENT'S CHECKLIST

Many government people think U. S. businesses are losing foreign export markets by default. P. 43

Miniature machines are being made to cope with problems in making space-age hardware and instruments. P. 42

Compacts haven't killed the market for the big luxury cars. P. 53

COMPARISON OF PRICES

(Effective July 5, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	July 5 1960	June 28 1960	June 7 1960	July 7 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$10.60	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	July 5 1960	June 28 1960	June 7 1960	July 7 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.57	$70.57	$70.57	$70.57
Foundry, South Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.41	$66.41	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$30.50	$30.50	$31.50	$43.50
No. 1 steel, Phila. area	33.50	33.50	33.50	37.50
No. 1 steel, Chicago	29.00	29.00	29.50	36.50
No. 1 bundles, Detroit	27.50	27.50	27.50	37.50
Low phos., Youngstown	33.50	33.50	34.50	44.50
No. 1 mach'y cast, Pittsburgh	48.50	49.50	49.50	51.50
No. 1 mach'y cast, Phila.	50.50	51.50	51.50	49.50
No. 1 mach'y cast, Chicago	45.50	45.50	48.50	59.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$31.00	$31.00	$31.50	$39.17
No. 2 bundles	20.83	20.83	21.17	26.67
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	$14.75-15.50	$14.75-15.50	$14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	33.00	33.00	33.00	31.50
Copper, Lake, Conn.	33.00	33.00	33.00	31.50
Tin, Straits, N. Y.	102.625*	101.75	101.00	103.00
Zinc, East St. Louis	13.00	13.00	13.00	11.00
Lead, St. Louis	11.80	11.80	11.80	11.80
Aluminum, virgin ingot	28.10	28.10	28.10	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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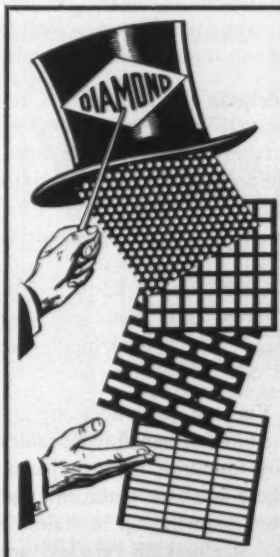

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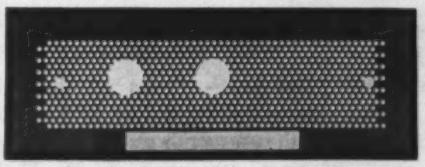

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Has The Market Hit Bottom?

A stronger pulsebeat of market activity is felt in some areas. There are also some scattered signs of firming prices.

But caution still colors the optimism.

■ In Chicago this week new purchases of factory bundles for July delivery boosted prices for this item by 50¢ to $1.00.

In Cleveland, auto lists showed highly competitive bidding giving some psychological strength in the market.

In St. Louis, one report says, "There is a general feeling that the downward trend in scrap steel prices is disappearing."

And in Cincinnati, major mills are in the market at somewhat higher than expected levels.

Crossed Fingers—But optimism is still cautiously expressed — and sometimes with crossed fingers. And some grades show signs of further price softness. This softness is mostly felt in the cast grades. Moderate price declines in some stainless lines are also noted in the Cleveland and New York markets.

Exports Still Strong — Exports continue to give life to the market in coastal cities. On the West Coast, exporters are planning to ship 70,000 tons of scrap to Japan in July.

Pittsburgh — Factory bundles were sold in this area for a little less than $1 under last month's prices. The drop was less than had been predicted, and some brokers took the moderate decline as a sign of optimism. On the industrial lists generally, prices were down, but later offerings brought higher bids than earlier ones. Many feel the floor has been reached, that prices have reached the point where scrap is attractive to users and sellers for future needs. There is not enough activity to test the market, but recent moves point to a firming of prices.

Chicago — New purchases of factory bundles for July delivery boosted factory bundles prices by 50¢ to $1. The expected bundle output appears to be off the preceding month by 30 to 50 pct in nearly all plants. Automotive output of bundles continues to run above originally forecast levels. Small purchases by mills continue in the face of growing dealer reluctance to trade at present levels.

Philadelphia — The market remains quiet with most support coming from a brisk export business. One local mill came back into the market with small buys. Cast grades slipped in price as foundries shut down for vacations. Heavy breakable cast slipped $2 to $37 to $38. Cupola cast, cast iron car wheels and No. 1 machinery cast dropped $1.

New York—Cast grades are off $1 on the basis of new buying prices posted by foundries in an adjacent area. There is some optimism, but few orders, showing up in stainless markets. Steelmaking grades are unchanged with exports still making the market.

Detroit — Prices on the July industrial list ended up $1-$2 a ton less than a month earlier. Industrial turnings went up $1-$1.25. There is some feeling the bottom on prices may have been reached. An indication of this is the fact that prices on the earliest lists were weakest, with strength building up a bit on later lists.

Cleveland — Later auto lists showed highly competitive bidding, giving some psychological strength to the market. Most bundles were absorbed in the market locally or out of the district. With model changeovers, tonnage for August will probably be lower.

St. Louis — There is a general feeling here that the downward trend in scrap steel prices is disappearing. The market is still slow and sluggish, but a bottom seems to have been reached. However, no signs of strength or any hope for an upturn is expected for 60 days.

Cincinnati—Major area mills are in the market at somewhat higher than expected levels. Buying programs are very small. Major production lists stayed in area, thus helping market supply.

Birmingham — Scrap dealers here say June was probably the slowest month in scrap movement in several years, including those in which there were steel strikes. This week was the slowest of the month. Orders placed earlier have been delivered, and few, if any orders were received.

Buffalo — No new first-of-the-month orders have come out yet. When they do come, small orders are expected at possibly lower prices. Dealers see little chance of a strengthening of the market soon.

Boston—Some export is the only factor sustaining the market. Domestic consumption is still at a standstill.

West Coast—Exporters are planning to ship 70,000 tons of scrap to Japan in July. A major mill is shutting down one blast furnace and two openhearths. Mill buying is non-existent.

Houston—The market is wallowing in the summer doldrums with both brokers and dealers adopting a watch-and-wait attitude. Export is providing a little bit of prop.

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SCRAP PRICES *(Effective July 5, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	31.00 to 32.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	24.00 to 25.00
No. 1 busheling	30.00 to 31.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	17.00 to 18.00
Low phos. punch'gs plate	37.00 to 38.00
Heavy turnings	27.00 to 28.00
No. 1 RR hvy. melting	35.00 to 36.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	52.00 to 53.00
RR specialties	46.00 to 47.00
No. 1 machinery cast.	48.00 to 49.00
Cupola cast.	41.00 to 42.00
Heavy breakable cast.	39.00 to 40.00
Stainless	
18-8 bundles and solids	195.00 to 200.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	105.00 to 110.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$28.00 to $30.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	28.00 to 30.00
No. 1 factory bundles	35.00 to 36.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	15.00 to 16.00
Low phos. forge crops	40.00 to 41.00
Low phos. punch'gs plate, ¼ in. and heavier	34.00 to 35.00
Low phos. 2 ft. and under	32.00 to 33.00
No. 1 RR hvy. melting	33.00 to 34.00
Scrap rails, random lgth.	41.00 to 42.00
Rerolling rails	49.00 to 50.00
Rails 2 ft. and under	48.00 to 49.00
Angles and splice bars	41.00 to 42.00
RR steel car axles	47.00 to 48.00
RR couplers and knuckles	38.00 to 39.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	40.00 to 41.00
Cast iron wheels	31.00 to 32.00
Malleable	43.00 to 44.00
Stove plate	34.00 to 35.00
Steel car wheels	37.00 to 38.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	85.00 to 90.00
430 bundles and solids	85.00 to 90.00
430 turnings	40.00 to 50.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	14.00 to 15.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Clean cast. chem. borings	23.00 to 24.00
Low phos. 5 ft and under	37.00 to 38.00
Low phos. 2 ft punch'gs	39.00 to 40.00
Elec. furnace bundles	36.00 to 37.00
Heavy turnings	27.00 to 28.00
RR specialties	39.00 to 40.00
Rails, 18 in. and under	56.00 to 57.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	37.00 to 38.00
Cast iron car wheels	41.00 to 42.00
Malleable	50.00 to 51.00
No. 1 machinery cast.	50.00 to 51.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.50 to $27.50
No. 2 hvy. melting	22.50 to 23.50
No. 1 dealer bundles	26.50 to 27.50
No. 2 bundles	17.50 to 18.50
Machine shop turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. 18 in. and under	33.00 to 34.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	50.00 to 51.00
No. 1 cupola cast.	35.00 to 36.00
Hvy. breakable cast.	32.00 to 33.00
Drop broken cast.	47.00 to 48.00

Youngstown

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	33.00 to 34.00

Cleveland

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	29.00 to 30.00
No. 1 factory bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	16.00 to 17.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	16.00 to 17.00
Cut structural & plates, 2 ft & under	35.00 to 36.00
Drop forge flashings	29.00 to 30.00
Low phos. punch'gs plate	30.00 to 31.00
Foundry steel, 2 ft & under	33.00 to 34.00
No. 1 RR hvy. melting	33.00 to 34.00
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	50.00 to 51.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	47.00 to 48.00
No. 1 machinery cast.	50.00 to 51.00
Stove plate	39.00 to 40.00
Malleable	47.00 to 48.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	75.00 to 80.00
430 bundles	80.00 to 85.00

Buffalo

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 busheling	29.00 to 30.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Low phos. plate	39.00 to 40.00
Structurals and plate, 2 ft and under	39.00 to 40.00
Scrap rails, random lgth.	37.00 to 38.00
Rails 2 ft and under	47.00 to 48.00
No. 1 machinery cast.	46.00 to 47.00
No. 1 cupola cast.	42.00 to 43.00

St. Louis

No. 1 hvy. melting	$30.00 to $31.00
No. 2 hvy. melting	27.00 to 28.00
Foundry steel, 2 ft	30.00 to 31.00
No. 1 dealer bundles	32.00 to 33.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	18.00 to 19.00
No. 1 RR hvy. melting	31.00 to 32.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	39.00 to 40.00
RR specialties	38.00 to 39.00
Cupola cast.	42.00 to 43.00
Heavy breakable cast.	33.00 to 34.00
Stove plate	35.50 to 36.50
Cast iron car wheels	35.00 to 36.00
Rerolling rails	47.00 to 48.00
Unstripped motor blocks	36.00 to 37.00

Birmingham

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	31.00 to 32.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	32.00 to 33.00
Elec. furnace, 3 ft & under	31.00 to 32.00
Bar crops and plate	36.00 to 37.00
Structural and plate, 2 ft.	35.00 to 36.00
No. 1 RR hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	40.00 to 41.00
Rails, 18 in. and under	45.00 to 46.00
Angles and splice bars	39.00 to 40.00
No. 1 cupola cast.	46.00 to 47.00
Stove plate	46.00 to 47.00
Cast iron car wheels	38.00 to 39.00
Unstripped motor blocks	36.00 to 37.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	21.00 to 22.00
No. 2 dealer bundles	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	10.00 to 11.00
Clean cast. chem. borings	18.00 to 19.00
No. 1 machinery cast.	37.00 to 38.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	165.00 to 170.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $25.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	27.00 to 28.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	24.00 to 25.00
Drop forge flashings	24.00 to 25.00
Machine shop turn.	8.00 to 9.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	11.00 to 12.00
Heavy breakable cast.	29.00 to 30.00
Mixed cupola cast.	33.00 to 34.00
Automotive cast.	42.00 to 43.00
Stainless	
18-8 bundles and solids	170.00 to 175.00
18-8 turnings	60.00 to 65.00
430 bundles and solids	60.00 to 65.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to $24.50
No. 2 hvy. melting	20.00 to 21.00
No. 1 dealer bundles	24.00 to 24.50
No. 2 bundles	14.00 to 15.00
No. 1 busheling	24.00 to 24.50
Machine shop turn.	5.00 to 6.00
Shoveling turnings	6.50 to 7.50
Clean cast. chem. borings	12.00 to 13.00
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	32.00 to 33.00
Heavy breakable cast.	26.50 to 27.50

San Francisco

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	30.00
No. 2 bundles	20.00
Machine shop turn.	$14.00 to 15.00
Cast iron borings	14.00 to 15.00
No. 1 cupola cast.	46.00

Los Angeles

No. 1 hvy. melting	$32.00
No. 2 hvy. melting	29.00
No. 1 dealer bundles	27.00
No. 2 bundles	17.00
Machine shop turn.	15.00
Shoveling turnings	15.00
Cast iron borings	$15.00 to 16.00
Elec. furnace 1 ft and under (foundry)	42.00 to 43.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$25.80
No. 2 hvy. melting, 2 ft. and under	25.50
No. 1 dealer bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bush., new fact., prep'd	25.50
Bush., New fact., unprep'd	20.45
Machine shop turn.	12.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	19.00
Machine shop turn.	12.00
Shoveling turnings	14.00
Cut structural plate 2 ft & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast.	32.00 to 33.00
Heavy breakable cast.	25.00 to 26.00

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THE SIZE
OF YOUR FURNACE
OR THE
MANNER OF
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IMPORT & EXPORT — LIVINGSTON & SOUTHARD, INC., CHRYSLER BUILDING EAST, NEW YORK, N. Y. • 5950 S. BOYLE AVE., LOS ANGELES 58, CAL. • *Cable Address:* FORENTRACO

Lead-Zinc Mine Bill Still Alive

Congressional recess leaves relief bill for small lead and zinc miners still alive.

It's up to the Senate, where politics may call the turn. Presidential attitude in doubt.

■ The initial reaction in Washington is that the extra session of Congress scheduled after the conventions won't help the small U. S. lead and zinc miners in getting their subsidy bill passed.

However, considering (1) the experience of the lead and zinc industry in bucking for legislation against odds for the last three years or so, and (2) their adroit maneuvering on the Edmondson subsidy bill thus far, it can't be counted out.

Political Angles—Then too, the situation now takes on some political overtones. The small, domestic lead and zinc miners have been pushing the bill (sponsored by Oklahoma's Rep. Ed Edmondson) to pay a subsidy of the difference between the market price and the level of 17¢ per lb for lead and 14½¢ for zinc.

The miners, and their home district Congressmen, got the bill out of a deadlocked committee onto the floor of the House. It passed. But before it could go further, the recess was called.

Not Scheduled — The August session is called for action on about a half-dozen "must" bills that the Democratic leadership has promised. The lead-zinc bill is not one of these.

However, Sen. Lyndon Johnson is known to be in sympathy with the miners. He is campaigning as a "Western" Senator, but how the convention turns out could affect his attitude.

There is strong indication that if the Edmondson bill ever comes up for a vote, it will pass the Senate. In the House, some very vocal and long-standing opponents of subsidies as such, voted for the lead-zinc subsidy. Apparently, keeping the benefits within strict limits, and applying them only to the small miners, has made the bill more acceptable to some of the opposition.

New Amendment—However, a late amendment introduced by Rep. G. L. Allot (R., Colo.) may have hurt the bill's chances.

The new amendment applies the subsidy to all producers, not just the small ones, and reduces the level where the subsidy starts to 15½¢ for lead, 13½¢ for zinc, on a sliding scale.

Payment will also be limited to 2000 tons combined of lead and zinc.

Nickel

Thus far, Freeport Nickel Co. is clinging to its plant in Cuba. The company isn't operating it. But at least it still owns it.

A company spokesman indicated that at the last meeting between company officials and the Cuban government there was "an air of reasonable negotiations." This was about two weeks ago.

This spokesman also notes that the Cuban government has, thus far, made no threats about nationalizing the plant. Nor have they seen any evidence of Russian technicians.

They would certainly be necessary if Cuba ever decides to run the Freeport Concentrator itself.

Aluminum

Shipments of aluminum to consuming industries in the third quarter should about equal the level of the first quarters of the year, says the Aluminum and Magnesium Div. of Business and Defense Services Administration.

But in the fourth quarter construction and building markets are expected to improve, and production of appliances turn upward. This is likely to lead to a notable pickup in aluminum shipments.

Also contributing to the expected surge in the last three months, says this BDSA Div. will be the increased amounts of aluminum used in the 1961 model cars.

Tin prices for the week. June 29 — 101.875; June 30 — 102.250; July 1—102.50*; July 5—102.50*. * Estimate.

Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in JUNE based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper, del'd Conn. Valley	33.00
Copper, Lake	33.00
Straits, Tin, New York	101.352
Zinc, E. St. Louis	12.90
Lead, St. Louis	11.80
Aluminum ingot	28.10

Note: Quotations are on going prices

Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	26.00	24.70	12/17/59
Aluminum ingot	28.10	26.80	12/17/59
Copper (E)	33.00	30-33	11/12/59
Copper (CS)	33.00	35.00	3/11/60
Copper (L)	33.00	31.50	11/6/59
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium ingot	38.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. TIN: See above; Other primary prices, pg. 115.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("P" temper except 6061-0)

Alloy	.038	.048-.061	.077-.096	.136-.250
1100, 3003	47.8	47.3	46.2	45.1
5052	54.2	53.0	50.8	49.2
6061-0	51.0	49.8	47.9	46.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	44.7-46.2	53.2-60.8
18-32	45.2-46.8	57.7-79.9
33-38	48.8-51.4	83.3-94.5
39-44	58.7-62.4	99.9-121.0

Screw Machine Stock—2011-T-3

Size"	¼	5/16-⅜	½-1	1¼-1½
Price	62.0	61.2	59.7	57.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
019 gage	$1.411	$1.884	$2.353	$2.823
024 gage	1.762	2.349	2.937	3.524

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand. Grade	.....	67.9	69.0	77.9	103.1
AZ31B Spec.	.....	93.3	96.9	108.7	171.3
Tread Plate	.....	70.6	71.7	.....	.....
Tooling Plate	73.0	.....	.....	.....	.....

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting) ..... 37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	136
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	57.13	.....	54.86	58.32
Brass, Yellow	50.57	50.86	50.26	54.23
Brass, Low	53.53	53.82	53.22	57.09
Brass, R L	54.58	54.87	54.27	58.14
Brass, Naval	55.12	.....	48.68	58.78
Muntz Metal	53.20	.....	48.26	.....
Comm. Bz.	56.17	56.46	55.86	59.48
Mang. Bz.	58.86	.....	52.21	.....
Phos. Bz. 5%	77.44	.....	78.10	.....

Free Cutting Brass Rod 36.06

TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; Mar. HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.. 29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be $65.00
Beryllium copper, per lb conta'd Be. $43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading $71.50
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.50
Calcium, 99.9% small lots ..... $ 4.55
Chromium, 99.8% metallic base.... $ 1.31
Cobalt, 97-99% (per lb) .... $1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined ..... 29.95 to 36.95
Gold, U. S. Treas., per troy oz..... $35.00
Indium, 99.9%, dollars per troy oz.. $2.25
Iridium, dollars per troy oz..... $75 to $85
Lithium, 98% ..... $9.00 to $12.00
Magnesium sticks, 10,000 lb. 57.00
Mercury, dollars per 76-lb flask f.o.b. New York ..... $210 to $212
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel 69.60
Palladium, dollars per troy oz..$24 to $26
Platinum, dollars per troy oz..$82 to $85
Rhodium ..... $137 to $140
Silver ingots (¢ per troy oz.)..... 91.375
Thorium, per kg. $43.00
Vanadium ..... $ 3.65
Zirconium sponge ..... $ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot
- No. 115 ..... 29.25
- No. 120 ..... 28.25
- No. 123 ..... 27.25

80-10-10 ingot
- No. 305 ..... 33.75
- No. 315 ..... 31.50

88-10-2 ingot
- No. 210 ..... 42.00
- No. 215 ..... 38.75
- No. 245 ..... 34.00

Yellow ingot
- No. 405 ..... 23.75

Manganese bronze
- No. 421 ..... 28.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
- 0.30 copper max. 25.75-26.00
- 0.60 copper max. 25.50-25.75

Piston alloys (No. 132 type)..28.00-29.00
No. 12 alum. (No. 2 grade)...24.75-25.25
108 alloy 25.25-25.75
195 alloy 27.75-28.75
13 alloy (0.60 copper max.)...25.75-26.00
AXS-679 (1 pct zinc) 25.00-26.00

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½% 25.25-26.25
Grade 2—92-95% 24.00-25.00
Grade 3—90-92% 23.00-24.00
Grade 4—85-90% 22.50-23.50

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	29	28¼
Yellow brass	22¼	20¼
Red brass	25¾	25
Comm. bronze	26½	26
Mang. bronze	20¾	20
Free cutting rod ends.	21¼	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26½
- No. 2 copper wire 24½
- Light copper 22¼
- *Refinery brass 22½
- Copper bearing material 21½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

- No. 1 copper wire 26¾
- No. 2 copper wire 24
- Light copper 21¾
- No. 1 composition 20½
- No. 1 comp. turnings 20
- Hvy. yellow brass solids 15
- Brass pipe 14
- Radiators 16

Aluminum

- Mixed old cast. ..... 13½—14
- Mixed new clips ..... 15 —15½
- Mixed turnings, dry ..... 14 —14½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

- No. 1 copper wire ..... 22¾—23
- No. 2 copper wire ..... 20½—21
- Light copper ..... 18½—19
- Auto radiators (unsweated).. 12½—13
- No. 1 composition ..... 17 —17½
- No. 1 composition turnings.... 15½—16
- Cocks and faucets ..... 13 —13½
- Clean heavy yellow brass .... 11¾—12¼
- Brass pipe ..... 13½—14
- New soft brass clippings .... 14 —14½
- No. 1 brass rod turnings .... 11½—12

Aluminum

- Alum. pistons and struts .... 7½— 8
- Aluminum crankcase ..... 11¼—11¾
- 1100 (2s) aluminum clippings 15 —15½
- Old sheet and utensils ..... 11¼—11¾
- Borings and turnings ..... 7 — 7½
- Industrial castings ..... 11¼—11¾
- 2020 (24S) clippings ..... 12½—13

Zinc

- New zinc clippings ..... 7 — 7¼
- Old zinc ..... 4½— 5
- Zinc routings ..... 3¼— 3½
- Old die cast scrap ..... 2¾— 3

Nickel and Monel

- Pure nickel clippings 52-54
- Clean nickel turnings 40
- Nickel anodes 52-54
- Nickel rod ends 52-54
- New Monel clippings 28-29
- Clean Monel turnings 20-23
- Old sheet Monel 24-26
- Nickel silver clippings, mixed 18
- Nickel silver turnings, mixed 15

Lead

- Soft scrap lead ..... 8 — 8¼
- Battery plates (dry) ..... 3 — 3¼
- Batteries, acid free ..... 2 — 2¼

Miscellaneous

- Block tin ..... 75 —76
- No. 1 pewter ..... 55 —56
- Auto babbitt ..... 39 —40
- Mixed common babbitt ..... 9¾—10¼
- Solder joints ..... 13¼—13¾
- Siphon tops 41
- Small foundry type ..... 9¾—10¼
- Monotype ..... 9¾—10¼
- Lino. and stereotype ..... 8¾— 9
- Electrotype ..... 7½— 7¾
- Hand picked type shells .... 5¼— 5¾
- Lino. and stereo. dross ..... 2¼— 2¾
- Electro dross ..... 2¼— 2¾

(Effective July 5, 1960)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Castle, Pa.									7.425* *M8*				
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1,P11*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3,B4* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*			6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

(Effective July 5, 1960)

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Hollowware Enameling 29 ga.
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*				7.525 *B3*	9.275 *B3*		6.40 *W6*	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*				7.575 *A2*						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*				7.575 *U1*	9.325 *U1*			$10.50 *U1*	$9.20 *U1*	
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*	6.775 *B3*		7.525 *B3*	9.275 *B3*	10.025 *B3*	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	
	Worcester, Mass.									6.70 *A5*			
	Trenton, N. J.												
MIDDLE WEST	Alton, Ill.									6.60 *L1*			
	Ashland, Ky.	5.10 *A7*		6.875 *A7*	6.775 *A7*		7.525 *A7*						
	Canton-Massillon, Dover, Ohio			6.875 *R1, R3*									
	Chicago, Joliet, Ill.	5.10 *W8, A1*					7.525 *U1, W8*			6.40 *A5, R3, W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*	7.65 *R3**	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*		6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*				7.525 *G3*	9.275 *G3*					
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3, Y1*	6.275 *U1, I3, Y1*	6.875 *U1, I3*	6.775 *U1, I3, Y1*	7.225 *U1*	7.525 *U1, Y1, I3*	9.275 *U1, Y1*		6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1, Y1*	7.85 *U1, Y1*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	7.95 *G2*
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*			7.225 *E2*							
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	6.775 *A7*	7.225 *A7*							
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3* 7.65 *R3**	6.775 *S1*	7.225 *S1**, *R3*	7.525 *R3, S1*	9.275 *R3,*				$9.10 *R3*	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 *U1, J3, P6*	6.275 *U1, J3, P6*	6.875 *U1, J3* 7.50 *E3**	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3*	10.025 *U1, J3*	6.40 *A5, J3, P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	7.85 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3, W5*	6.875 *W3, W5* 7.50 *W3**		7.225 *W3, W5*	7.525 *W3*	9.275 *W3*			$10.40 *W5, W3*	$9.10 *W5, W3*	7.85 *W5*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*	7.50 *J3**	6.775 *Y1*		7.525 *Y1*	9.275 *Y1*		6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*				8.25 *K1*	10.40 *K1*			$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*	6.775 *T2*					6.40 *T2, R3*	$10.50 *T2*	$9.20 *T2*	
	Houston, Texas									6.65 *S2*			

*Electrogalvanized sheets.

(Effective July 5, 1960)

*7.425 at Sharon-Niles is 7.225

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *C4*		7.50 *C4*	7.95 *C4*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5.675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*					5.30 *N4*				8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Weirton, Wheeling, Follansbee, W. Va.							5.30 *W5*				
	Youngstown, Ohio	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, B5*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*				9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas	5.925 *S2*	5.925 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective July 5, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angel Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A9 Acme-Newport Steel Co., Newport, Ky.
A10 Alaska Steel Mills, Inc., Seattle, Wash.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Steel Co., Pacific Coast Div.
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7 A. M. Byers, Pittsburgh
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C4 Claymont Products Dept., Claymont, Del.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.

D1 Detroit Steel Corp., Detroit
D2 Driver, Wilbur B., Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire-Reeves Steel Corp., Mansfield, O.
E3 Enamel Products & Plating Co., McKeesport, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owenboro, Ky.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Calif.
K2 Keystone Steel & Wire Co., Peoria
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.
M8 Mill Strip Products Co., Evanston, Ill.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9 Nelson Steel & Wire Co.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Steel Corp., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P13 Phoenix Mfg. Co., Joliet, Ill.
P14 Pacific Tube Co.
P15 Philadelphia Steel and Wire Corp.

R1 Reeves Steel & Mfg. Div., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon Pa.
S2 Sheffield Steel Div., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Div. of Copperweld Steel Co.
S10 Seneca Steel Service, Buffalo
S11 Southern Electric Steel Co., Birmingham
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.
S13 Seymour Mfg. Co., Seymour, Conn.
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago.
W8 Wisconsin Steel Div., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery‡ Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	.....	.....	.....	.....
Baltimore**	$.10	8.37	9.71	10.16	10.78	8.94	9.63	9.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	.....	.....	.....
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.95	10.10	11.30	10.80	9.15	9.80	9.15	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.89	10.35	11.10	10.55	8.82	9.48	8.99	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.06	10.41	11.10	10.87	9.20	10.04	9.31	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.88[1]	10.03	11.29	10.66	9.07	9.90	9.11	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	.....	.....	.....	20.84
Detroit**	.15	9.15	10.61	11.45	10.92	9.19	10.04	9.30	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[2]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.82	10.54	9.67	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.99	10.20	.....	11.39	10.27	10.48	10.07	12.89	.....	.....	.....	.....
Milwaukee**	.15	9.03	10.49	11.24	10.69	8.96	9.70	9.13	11.04	17.24	16.24	21.24	20.49
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	.....	.....	8.90	8.65	9.20	8.90	10.70	.....	.....	.....	.....
Philadelphia**	.10	8.95	9.70	10.76	10.95	9.30	9.95	9.35	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.58	10.03	11.18	10.64	8.83	9.51	9.00	11.40	17.10	16.10	19.70	20.45
Portland**		10.20	12.05	12.35	12.20	10.35	10.80	10.20	16.65	18.50	17.45	20.75	20.25
San Francisco**	.10	10.27	11.79[2]	11.55	11.88	10.48	10.50	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.07	11.44	12.05	11.84	10.17	10.59	9.96	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.99	10.75	11.48	10.65	8.93	9.60	8.97	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.74	10.99	11.16	8.83	9.33	9.27	11.64	.....	16.69	.....	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—¼" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—⅝-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective July 5, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	.....	.....	.....
Birmingham *W9*	62.00	62.50*	66.50	.....	.....
Birmingham *U4*	62.00	62.50*	66.50	.....	.....
Buffalo *R3*	66.00	66.50	67.00	67.50	.....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	.....
Chester *P2*	68.00	68.50	69.00	.....	.....
Chicago *I4*	66.00	66.50	66.50	67.00	.....
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	.....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Everett *M6*	67.50	68.00	68.50	.....	.....
Fontana *K1*	75.00	75.50	.....	.....	.....
Geneva, Utah *C7*	66.00	66.50	.....	.....	.....
Granite City *G2*	67.90	68.40	68.90	.....	.....
Hubbard *Y1*	.....	.....	66.50	.....	.....
Ironton, Utah *C7*	66.00	66.50	.....	.....	.....
Lyles, Tenn. *T3*	.....	.....	.....	.....	73.00
Midland *C11*	66.00	.....	.....	.....	.....
Minnequa *C6*	68.00	68.50	69.00	.....	.....
Monessen *P6*	66.00	.....	.....	.....	.....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	.....	66.50	67.00	67.50	.....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	.....	66.50	67.00	.....
So. Chicago *R3*	66.00	66.50	66.50	67.00	.....
So. Chicago *W8*	66.00	.....	66.50	67.00	.....
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66.00	66.50	66.50	67.00	.....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	.....	.....	66.50	.....	.....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1, I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

	Discount Hex	Square
Full Cartons	46	57
Bulk		
¼ in. diam or smaller	25,000 pcs	
5/16 or ⅜ in. diam	56	60
	15,000 pcs	
	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mills

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective July 5, 1960)

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	43.75	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7.* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1.*

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* wensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Annl'd ¢/lb.	Merch. Wire Galv. ¢/lb.
	Col	Col	Col	Col	Col		
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	.....	.....	190	9.00	9.675
Atlanta *A8***	175	193	...	214	199	9.10	9.85
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	.....	.....	.....	.....	.....	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	.....	.....	.....	.....	.....	9.00	9.55
Cleveland *A6*	.....	.....	.....	.....	.....	.....	.....
Cleveland *A5*	.....	.....	.....	.....	.....	9.00	.....
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	.....	.....	.....	.....	.....	.....
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	.....	.....	.....	.....	.....	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	.....	.....	.....	.....	.....	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	.....	.....	213	9.95	10.50
Rankin Pa. *A5*	173	187	.....	.....	193	9.00	9.55
So. Chicago *R3*	173	187	.....	.....	193	8.65	9.20
S. San Fran. *C6*	.....	.....	.....	236	.....	9.95	10.50
SparrowsPt. *B3***	175	.....	.....	215	198	9.10	9.775
Struthers, O. *Y1**	.....	.....	.....	.....	.....	8.65	9.20
Worcester *A5*	179	.....	.....	.....	.....	9.30	9.85
Williamsport *S5*	.....	.....	.....	.....	.....	.....	.....

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $290 per net ton.

STANDARD T. & C.	BUTTWELD ½ In. Blk.	½ In. Gal.	¾ In. Blk.	¾ In. Gal.	1 In. Blk.	1 In. Gal.	1¼ In. Blk.	1¼ In. Gal.	1½ In. Blk.	1½ In. Gal.	2 In. Blk.	2 In. Gal.	2½–3 In. Blk.	2½–3 In. Gal.	SEAMLESS 2 In. Blk.	2 In. Gal.	2½ In. Blk.	2½ In. Gal.	3 In. Blk.	3 In. Gal.	3½–4 In. Blk.	3½–4 In. Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50								
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50								
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50								
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50								
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Fontana *K1*	*6.25		*2.25		0.75		1.25		1.75		2.25		2.75									
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50								
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50								
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50								
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.5
Chicago	139.8
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville, Is., Pa.	30.75

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No matter what material your product demands Mundt can supply the exact perforation you need. Steel, brass, copper, monel, bronze, aluminum, zinc, tinplate, lead, stainless steel, coated metals, bonded materials, plastics, and paper are punched as required for every functional and ornamental need.

You can count on Mundt's guarantee that sheets are perfectly flat, straight, parallel on the sides, and free from buckle or camber.

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Size and location of the oil ports in the pump body illustrated are maintained within *a tolerance of 0.015 inch* by using shell-cores.

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FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, .30-1.00% max. Si.

0.02% C....	41.00	0.50% C....	32.75
0.05% C....	33.50	1.00% C....	32.50
0.10% C....	33.25	1.50% C....	32.25
0.20% C....	33.00	2.00% C....	32.00

4.00-4.50% C, 60-70% Cr, 1.2% Si.. 28.75
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 28.25
0.025% C (Simplex) 31.50
5-7% C, 61-65% Cr, 5-8% Si 22.00
5% max C, 50-55% Cr, 2% max Si.. 25.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.
0.10% max. C $1.29
9 to 11% C, 88-91% Cr, 0.75% Fe... 1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.
Carloads $1.15
Ton lots 1.17
Less ton lots 1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.
Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.
Carloads, bulk 24.00
Ton lots 27.95
Less ton lots 29.45

Calcium-Manganese—Silicon

Cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.
Carloads, bulk 23.00
Ton lots 26.15
Less ton lots 27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.
Ton lots 21.15
Less ton lots 22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.
Carload lots 18.45
Ton lots 19.95
Less ton lots 21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.
Carload bulk 19.20
Ton lots to carload packed 21.15
Less ton lots 22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:
Carloads, bulk 13.70
Ton lots packed in bags 16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	35 lb, down	Neville Is., Pa. 35 lb
16-19% ..	$98.00	$96.00	$100.50
19-21% ..	100.00	98.00	102.50
21-23% ..	102.50	100.50	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads, bulk 34.25
Ton lots, palletized 36.25
250 to 1999 lb 39.00
Premium for Hydrogen - removed metal 0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn 24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C.	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.
Carloads bulk 11.60
Ton lots, packed 13.25
Carloads, bulk, delivered, per lb of briquet 14.00
Briquets, packed pallets, 2000 lb up to carloads 16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe..	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 8.00
Ton lots, packed 10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
		90% Si....	20.00

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.
Openhearth 3.20
Crucible 3.30
High speed steel 3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots .....$	2.05	$2.95	$3.75
100 to 1999 lb..	2.40	3.30	4.55

(Effective July 5, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.
Carloads, bulk ..... 9.85¢
Ton lots ..... 11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound
Ton lots $3.45
Less ton lots 3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta $3.40

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo.. $1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage, per gross ton $120.00
10 tons to less carload $131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots $1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $255.00

Ferrotungsten, ¼ x down packed, per pounds contained W, ton lots delivered ..... $2.15 (nominal)

Molybdic oxide, briquets per lb contained Mo, f.o.b. Langeloth, Pa. $1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.
Carload, bulk lump ..... 18.50¢
Ton lots, packed lump ..... 20.50¢
Less ton lots ..... 21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5 .... $1.38

Zirconium silicon, per lb of alloy
35-40% del'd, carloads, bulk.. 26.25¢
12-15%, del'd lump, bulk-carloads ..... 9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B
2000 lb carload $5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound ..... 30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.
Ton lots per pound ..... 18.25¢

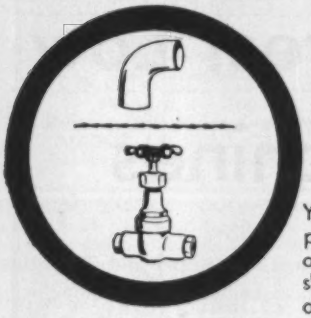
Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.. $1.20
F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up
10 to 14% B ..... .85
14 to 19% 1.20
19% min. B 1.50

Grainal, f.o.b. Cambridge, O., freight, allowed, 100 lb and over
No. 1 ..... $1.05
No. 79 ..... 50¢

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots (packed) $1.46
Less ton lots (packed) 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots 2.15

Stainless pipe and fittings



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PIPE: 1/8 IPS through 12" IPS seamless and welded schedules 5 - 80

FITTINGS: 1/8 IPS through 4" IPS threaded and welding type

VALVES: 1/4 IPS — 2" IPS

Also **mill shipments** of corrosion resistant items up to 48" OD. Send for FREE literature.

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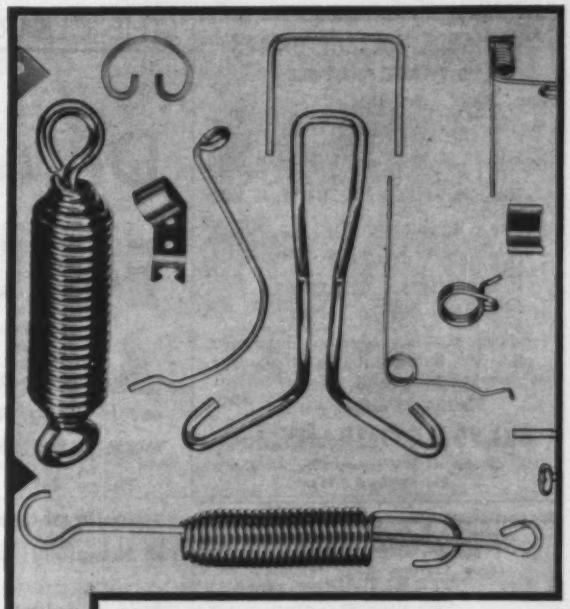

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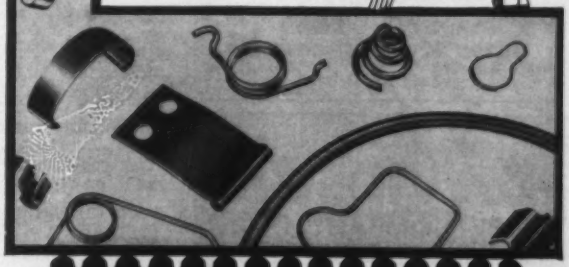

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3 PHASE 60 CYCLE

Quan. Size Description
2—3000 HP DC MOTORS—525 V. 600 RPM Whse. M. G. Sets—2500 K.W. Whse., 2300/4160 V.
1—2750 HP DC MOTOR 450 V. 300 RPM Elliott 2200 K.W., Gen. Elec. 3 unit 450 V. DC Gen. with 3000 H.P. 720 RPM, 2300 V. AC Motor and Etc.
1—2250 HP DC MOTOR 600 V. 400/500 RPM, G.E. M.G. Set—2000 K.W. G.E. AC Motor—2300 V.
1—1500 HP DC MOTOR 600 V. 600 RPM Whse. M. G. Set. 1500 K.W. G.E. 13,200 V.
1—1500 HP DC MOTOR 600 V. 300/700 RPM Whse. M.G. Set—1500 K.W. G.E. 13,200 V.
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CONTRACTOR EQUIP. & MACHINERY
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SHEET METAL MACHINERY
SPECIAL—13' 3/16" Shear, 20" Gap, Extra blades, 10' Squaring Arm.....$5,000.00
10' 3/16" Shear, 16" Gap, Extra blades.
10' 14 ga. Pexto Shear, Model S-2120
60 ton Niagara Punch Press, 22" throat
50 ton Federal Punch Press, #5 OBI
43 ton Niagara Punch Press, 20" throat
36 ton L & J Punch Press, #4 OBI
20' x 1" cap. Pyramid Type Bending Roll
6' x 3/16" cap. Initial Type Bending Roll
8' 12 ga. Sturdybender Press Brake
5' 14 ga. Dreis & Krump Press Brake
4' 18 ga. Dreis & Krump Press Brake
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WAlnut 2-1734, 3488

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PIPE COMPANY INC.
ONE OF THE LARGEST STOCKS IN THE EAST
Seamless and Welded 1/8" to 26" O.D.
All wall thickness Manufactured.
Specialty large sizes.
Cutting — Threading — Flanging — Fittings — Valves.
Call GEdney 9-6300
50th St. & 2nd Ave., Bklyn 32, N. Y.

Detroit Interest Low For Old Machines

Detroit dealers report interest is dying for used machines made in the 1940's.

There is a possibility of a scarcity of good machines made in the early 1950's.

■ Detroit used machinery dealers note a trend that's been forming since the first of the year.

At the start of 1960 interest in equipment made during the 1940's fell noticeably. More inquiries for such items as radial drills and milling machines began specifying models built in the 1950's.

Old Stock — Meanwhile, large manufacturing companies are getting rid of 1940-built machinery now that their depreciation write-off value has run out. What could be developing is a scarcity of top quality tools of 1950 vintage, with increasing inventories of tools over 10 years old.

The first half of 1960 saw fair business in Detroit. Helping things along for suppliers of tool room equipment was bustling activity by tool and die shops engaged in 1961 model car programs. But the programs are ending now, and 1962 model tool and die work isn't expected to be placed until pretty late this year. This could mean a slack summer and autumn for the used machine trade, followed perhaps by a fourth-quarter rush.

Lost Market—A major production machine house in the city gives an interesting reason for its reduced business this year. A year ago, a spokesman says, various U. S. auto makers were buying used machinery for dispatch to such South American countries as Brazil and Argentina. Vehicle engine and manufacturing programs were being set up there. There is no such business now.

Prices are stable this year, according to dealers and auctioneers. Tool-making machines may be down a bit in price from a year ago. But in general, a steady level is being maintained. Auctioneers point out an increase in auctions this year compared to a year ago. The reason is more people are going out of business.

Demand for Quality—Inventories in Detroit are higher than a year ago. But employment in used machine warehouses seems to be holding steady. Production machinery sales offices indicate there is more shopping around by customers than at any time they can remember. This includes out-of-state customers. Quality machinery is demanded though, with people expecting firm guarantees for any equipment bought.

"Hereafter, we'll allow plant engineering to rearrange the furniture, if that's alright with you, Miss Wilkinson."

RAILWAY EQUIPMENT

USED and RECONDITIONED

RAILWAY CARS and REPAIR PARTS

FLAT CARS

4—50-Ton Capacity, 43' long
Steel Underframe

30—Used, All-Steel
30-Cubic Yard, 50-Ton Capacity
MAGOR AIR DUMP CARS
Excellent Condition—Immediate Delivery

DIESEL-ELECTRIC LOCOMOTIVES
1, G. E. 25-Ton, 150 H.P., Std. Ga.
3, G. E. 44-Ton, 400 H.P., Std. Ga.
1, G. E. 80-Ton, 500 H.P., Std. Ga.
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TYPE 8-RGF MEDART
Capacity 2½" to 8" Serial 1051
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Miscellaneous Spare Parts and Cutter Heads

Condition Excellent In Stock

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REBUILT—GUARANTEED ELECTRICAL EQUIPMENT

MOTOR GENERATOR SETS

Qu.	KW	Make	D.C. Volts	A.C. Volts
1	3500	Al.Ch. (8-unit)	350	13800/4160
1	3000	Al.Ch. (8-unit)	600	13800/4160
1	2400	G.E.	300	4600/2300
1	1520	S.&S. (3-unit)	600	2300
1	1500	G.E.	250	4600/2300
1	1325	Whse.	600	2300
1	1250	G.E.	132/265	4160
1	1060	S.&S.	600	2300
2	500	G.E.	250	4160/2400
1	350	G.E.	250	4000/2300
1	300	Al.Ch. (3-unit)	250	2300
1	300	G.E.	250	4000/2300
3	250	Whse.	250	4000/2300
2	200	G.E.	250/275	4000/2300
2	150	G.E.	250	440
1	150	Reliance	125	2300
1	125	G.E.	250	2300/440
1	100	G.E.	250	4000/2300
1	75	G.E.	250	2300/440

DIRECT CURRENT MOTORS
Adjustable and Constant Speed
(Suitable for MILL and STANDARD DUTY)

Qu.	H.P.	Make	Volts	R.P.M.
1	3000	G.E.	600	90/180
2—N-*	3000	Whse.	600	600
2—N-*	2700	G.E.	415	280
1—N-*	2500	Whse.	700	100/162
1—N-*	2200	Whse.	600	92/132
2—N-*	2000	G.E.	350	230/350
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3—N-*	1500	Whse.	600	165/300
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2— *	650	S.&S.	300	1000/1350
2	600	Al.Chal.	600	300/600
1	600	Whse.	250	110/220
2	300	Whse.	230	300/600
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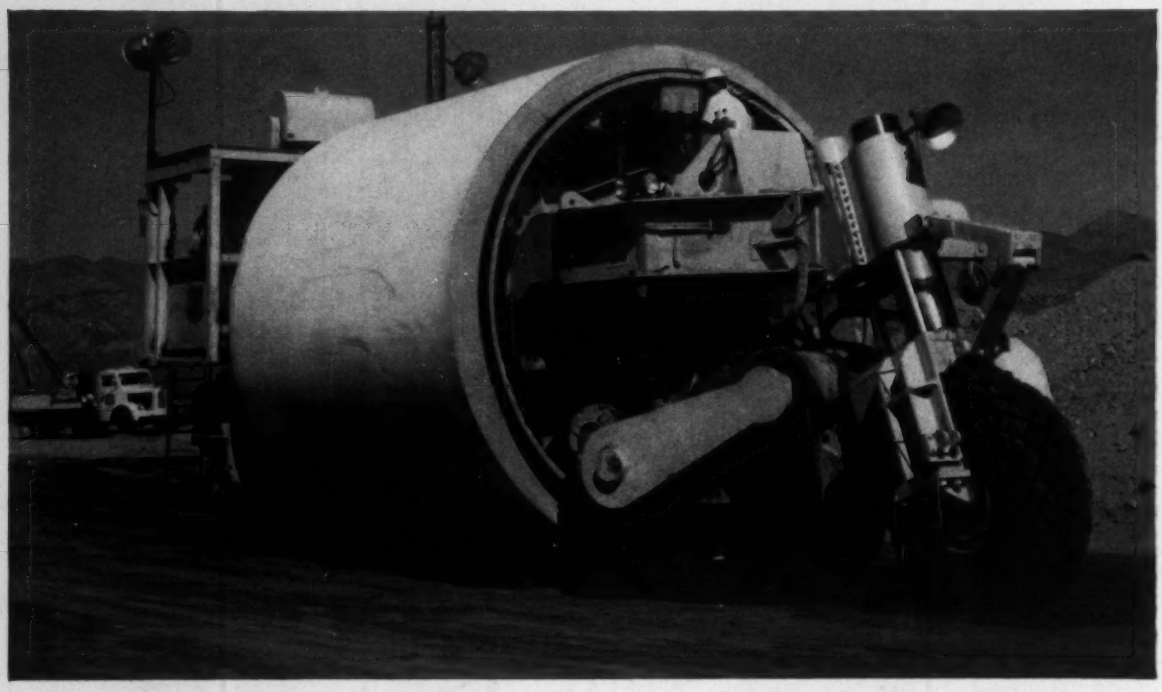

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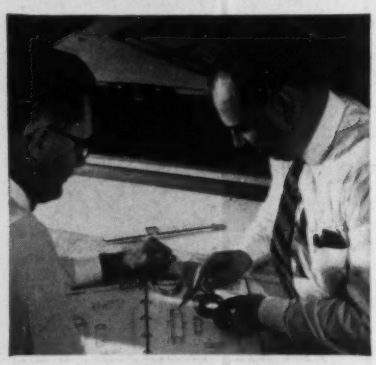

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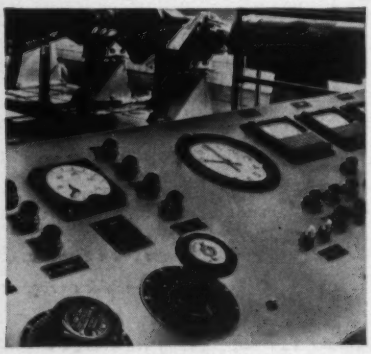

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